PHASE II REMEDIAL ACTION REPORT

FORMER P.R. MALLORY PLANT SITE
CRAWFORDSVILLE, INDIANA

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CRAWFORDSVILLE, INDIANA

September 1988
Ref. No. 1916

CONESTOGA-ROVERS & ASSOCIATES

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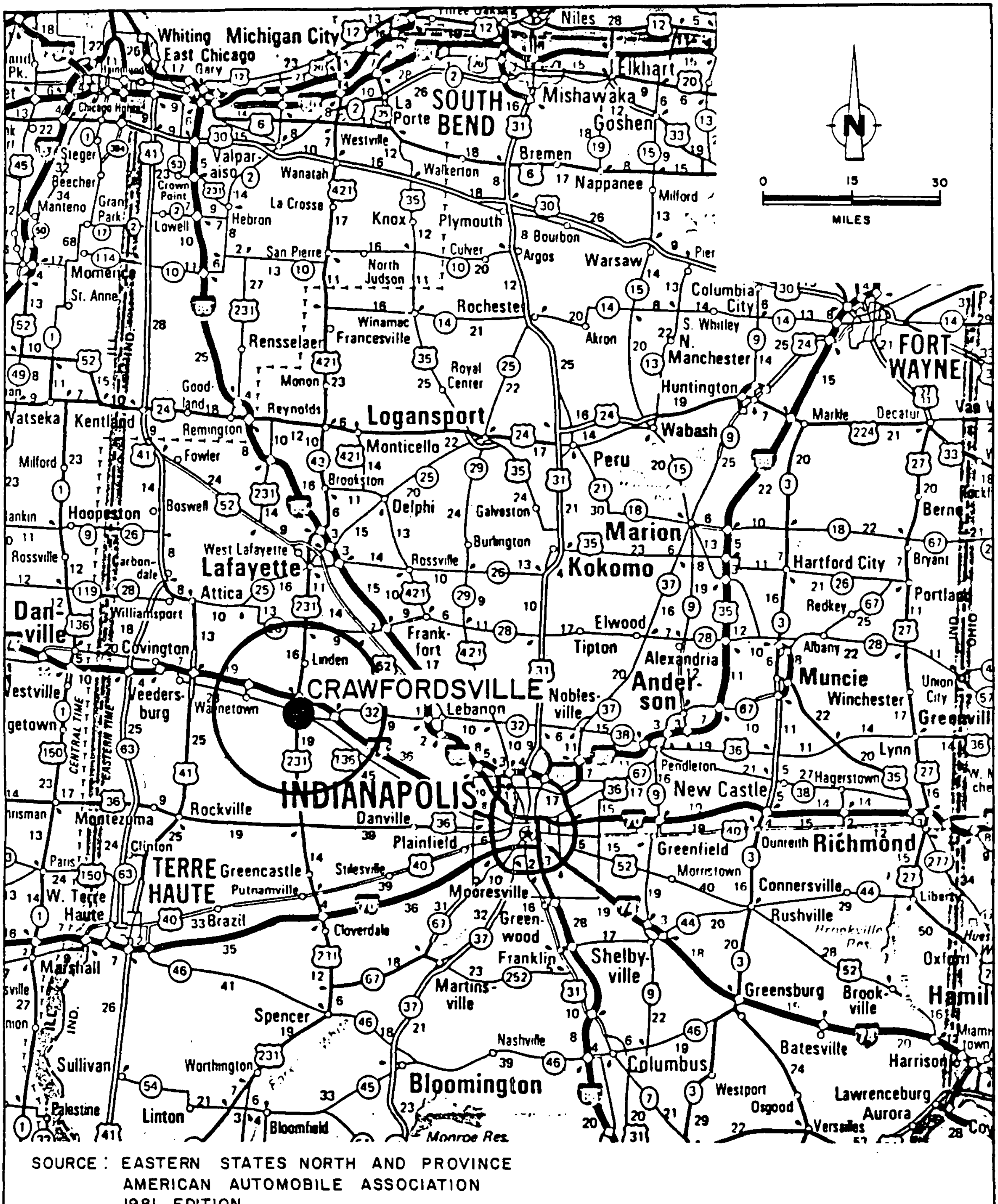
1.0 INTRODUCTION

1.1 GENERAL

The former P.R. Mallory plant site is located approximately three miles east of Crawfordsville, Indiana on the north side of State Road No. 32 (see Figure 1.1). The P.R. Mallory Company manufactured dielectric capacitors at the plant site from 1957 until 1969 when the plant was destroyed by fire.

The former plant site encompasses approximately four acres. The site is bordered by State Road 32 on the south, Superior Moving and Storage on the east, Little Sugar Creek on the north and Terra Products on the west. The concrete slab from the former plant building is located on the southern portion of the site. The pumphouse and incinerator for the former plant are located north of the existing concrete slab. A ravine and intermittent stream run through the northern portion of the site and connect with Little Sugar Creek at the northern boundary. The general site layout is illustrated on Plan 1.

The United States Environmental Protection Agency (EPA) issued an amended Administrative Order on August 20, 1986 which required the respondents [Duracell International Inc. (Duracell), Terra Products, and Superior



SOURCE: EASTERN STATES NORTH AND PROVINCE
AMERICAN AUTOMOBILE ASSOCIATION
1981 EDITION

figure 1.1

SITE LOCATION
Crawfordsville, Indiana

CRA

1916-4/04/88-21-D-0

Moving and Storage] to implement emergency removal activities at the former plant site.

In response to the Administrative Order issued by the EPA, Duracell has implemented emergency removal activities at the site in two separate phases. Phase I remedial activities included construction of a security fence around the plant site and disposal areas, excavation and on-site securement of capacitors and contaminated soil and debris within the fenced area, implementation of a comprehensive sampling and analysis plan for site characterization, and development and implementation of a hydrogeological investigation.

Implementation of the Phase II remedial construction activities included removal of significantly contaminated soils from areas outside the site security fence and placement of the soils in a containment cell constructed on the site. This work was undertaken to minimize the potential for the continued release of contaminants to the environment and to restrict public access and exposure to potentially contaminated materials.

The Phase II Remedial Action Report presented herein identifies the activities undertaken by Duracell during the Phase II remedial program. The report includes:

1. A summary of the various submissions made to the EPA and the Indiana Department of Environmental Management (IDEM);

2. A description of activities undertaken prior to the Phase II Remedial Action;

3. A description of the Phase II remedial construction activities undertaken at the site, commencing February 8, 1988; and

4. A review of the environmental sampling program carried out during on-site Phase II activities.

1.2 SITE BACKGROUND

The Indiana Department of Environmental Management (IDEM) conducted a site inspection of the former P.R. Mallory facility on October 10, 1985. During the inspection, IDEM representatives observed capacitors lying on the ground surface and along the bank of a ravine adjacent to the plant site.

On April 15, 1986 IDEM representatives collected three capacitors from the apparent capacitor disposal area. Subsequent analysis of oil from the

capacitors indicated PCB concentrations in the oil as high as 100 percent.

As a result of the site inspections, the IDEM requested the EPA to investigate and initiate a removal action at the former plant site.

On April 19, 1986, EPA representatives conducted a site assessment which included a preliminary soil sampling program. The results of the sampling program indicated that PCB concentrations in the soil in the apparent capacitor disposal area ranged from 325 parts per million (ppm) to 165,402 ppm. Based on the site assessment, an Administrative Order was issued on June 23, 1986 to Duracell International Inc., the former site owner and operator, and to Terra Products Inc., the current site owner. Under the terms of the Administrative Order, respondents were required to restrict access to the site; perform a contamination assessment of the facility; and develop and implement a work plan to remove and secure capacitors and contaminated soil and debris. A meeting was held between Duracell and the IDEM on June 26, 1986. Duracell representatives also met with IDEM and EPA officials on July 7, 1986 to review the Administrative Order and Duracell's proposed schedule of work activities.

The work activities identified in Duracell's proposed schedule included:

1. A legal boundary survey of the site;
2. Installation of a security fence around the site;
3. Installation of a sediment trap and oil absorbent boom in the ravine;
4. Preliminary soil sampling and analysis to determine contaminants of concern;
5. Preparation and submission of a comprehensive Work Plan and Health and Safety Plan to the Agencies;
6. Implementation of the approved Work Plan; and
7. Submission of a final report.

The legal boundary survey of the site, initiated by Duracell, indicated the apparent disposal area was located outside the former P.R. Mallory property, on land occupied by Superior Moving and Storage.

The EPA issued an amended Administrative Order on August 20, 1986. The amended order incorporated the work activities identified in Duracell's proposed schedule of work activities and named Superior Moving and Storage as a respondent thereby providing access to the suspected disposal area.

Preliminary work at the site was initiated prior to issuance of EPA's amended Administrative Order to ensure the response action proceeded in an expeditious manner.

Duracell submitted a proposed sampling and analysis plan to the Agencies (EPA and IDEM) on July 14, 1986. The plan was intended to identify contaminants of concern present at the site prior to development of a remedial work plan and health and safety plan. The sampling plan was conditionally approved by EPA on July 28, 1986.

Construction of a security fence around the former plant site and disposal area began on August 11, 1986. The fence installation was completed on August 28, 1986. A sediment trap constructed of baled hay and an oil absorbent boom were installed in the ravine concurrently with the installation of the fence.

The preliminary sampling and analysis program was conducted at the plant site by Conestoga-Rovers & Associates (CRA). Samples were collected at the site on August 6, 1986 in accordance with the approved sampling plan. The results of the sampling program are presented in a report entitled "Initial Site Screening: Sampling Program, Former P.R. Mallory Plant Site, Crawfordsville, Indiana", forwarded to the EPA and the IDEM by Duracell on September 18, 1986.

The preliminary sampling and analysis program confirmed the presence of PCBs, dioxins and dibenzofurans in the soil at the site. PCB concentrations in the soil ranged from a maximum of 130,000 ppm in the main disposal area to 7,200 ppm adjacent to the incinerator. Concentrations of total dioxin varied from 40.1 ppb in the disposal area to 0.75 ppb in the ravine; dibenzofuran concentrations varied from approximately 1.0 ppm to a maximum concentration of 5.1 ppm detected in the disposal area.

Duracell developed a Response Action Work Plan (RAWP) for the site based on the results of the preliminary sampling and analysis program. The RAWP proposed to undertake remedial activities at the site in two phases. Phase I of the plan included: excavation and on-site securement of capacitors and contaminated soil and debris; implementation of a comprehensive sampling and analysis plan; and, development and implementation of a hydrogeological investigation. The scope of any subsequent action at the site would be dependent on data generated from the Phase I program. Duracell submitted the RAWP to the Agencies for review on October 9, 1986.

Duracell met with EPA and IDEM on October 27, 1986 to review the RAWP. A revised RAWP was forwarded to the Agencies on October 31, 1986; the revised RAWP was accompanied by detailed specifications and plans for the

Phase I Remedial Construction program, as requested by the EPA. The EPA conditionally approved the RAWP on November 12, 1986.

A Quality Assurance Project Plan (QAPP) was developed to identify sampling and analytical activities associated with the field investigation component of the RAWP. The QAPP was forwarded to the Agencies on November 13, 1986. The IDEM commented on the QAPP by letter dated December 22, 1986. CRA responded to the comments in a letter dated January 6, 1987.

Phase I remedial action at the site consisted of three major activities including remedial construction, a site sampling and analysis program and a hydrogeological investigation. All activities were carried out concurrently, during the period from November 30, 1986 to January 16, 1987.

Phase I construction activities included:

i) construction of a concrete equipment decontamination pad,

ii) construction of a concrete soil storage cell, and

iii) removal of capacitors, contaminated soil and debris, and on-site securement in the newly constructed storage cell.

Details of the Phase I remedial construction activities were submitted to the Agencies on February 23, 1987 in a report entitled "Phase I Remedial Action Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana".

The site sampling and analysis program conducted during Phase I remedial action involved the collection of 221 soil, 25 sediment, 19 surface water, 10 groundwater, 3 air, 5 concrete core, and 6 surface wipe samples. Details of the sampling and analysis program are included in a report entitled "Phase I Sampling and Analysis Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana", submitted to the Agencies on April 3, 1987.

The hydrogeological investigation performed at the site during Phase I remedial action included the installation of a total of seven observation wells at five locations about the site, and collecting representative groundwater samples from the wells. Details of the Phase I hydrogeological investigation are included in a report entitled "Hydrogeological Investigation, Interim Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana", submitted to the Agencies on April 3, 1987.

Following a review of the data generated during the Phase I sampling and analysis program, an

additional sampling program was developed in order to further delineate the areal and vertical extent of residual soil contamination at the site. The proposed supplemental sampling program was presented in a report entitled "Phase I Supplemental Soil Sampling Program, Former P.R. Mallory Plant Site, Crawfordsville, Indiana", submitted to the Agencies for review on April 14, 1987. The Phase I supplemental soil sampling program was conditionally approved by the IDEM and USEPA by letter dated May 6, 1987. The supplemental samples were collected at the site from May 8 to May 15, 1987. Concurrent with the supplemental soil sampling, a second round of groundwater samples was also collected. Details of the supplemental soil sampling and second round of groundwater sampling are presented in reports entitled "Phase I Supplemental Sampling and Analysis Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana" and "Hydrogeological Investigation Supplemental Data Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana", submitted to the Agencies on July 20, 1987.

On September 11, 1987, an updated "Phase I Supplemental Sampling and Analysis Report" was forwarded to the Agencies for review. This report was revised and reissued, to incorporate results of dioxin/furan analyses not previously included in the original submission and to correct laboratory reporting errors for several of the PCB results.

2.0 PRE-CONSTRUCTION ACTIVITIES

Based on information obtained during Phase I Remedial Action and Phase I Supplemental Sampling and Analysis Programs, Duracell developed the Phase II Response Action Work Plan for additional remedial work at the site. Duracell submitted the Phase II Response Action Work Plan to the EPA and IDEM for review on November 5, 1987. The EPA conditionally approved the Phase II RAWP on December 2, 1987.

Following preparation of the detailed plans and specifications for implementation of the Phase II RAWP, Duracell retained O.H. Materials of Findlay, Ohio for implementation of various Phase II remedial construction activities. Representatives of CRA, IDEM, O.H. Materials and local Crawfordsville officials met on January 27, 1988 to review the proposed scope of work for this program and to discuss an off-site contingency plan to be followed in the event of an emergency at the site.

3.0 PHASE II RESPONSE ACTION

Phase II remedial activities at the site were carried out in accordance with the approved Phase II Response Action Work Plan. Phase II consisted of three major activities including: remedial construction; an investigative and confirmatory sampling program; and additional hydrogeological investigation. All work was carried out in accordance with the approved site Health and Safety Plan. The work tasks associated with each of the Phase II activities are described in the sections which follow.

3.1 PHASE II REMEDIAL CONSTRUCTION

3.1.1 General

Duracell retained O.H. Materials Corp. of Findlay, Ohio as general contractor for the Phase II Remedial Construction Program. All construction activities were performed under the supervision and direction of Conestoga-Rovers & Associates. EPA representatives were on site during all major construction activities, including construction of the various containment cells, soil excavation, and liner installations. Representatives from IDEM were on site on a periodic basis during Phase II activities.

3.1.2 Mobilization and Site Preparation

Mobilization of O.H. Materials personnel, material and equipment commenced on February 8, 1988.

Prior to commencing work activities on site, a site health and safety indoctrination session was conducted by a certified industrial hygienist employed by O.H. Materials. The majority of personnel to be involved in on-site work activities were present for the health and safety indoctrination meeting. Subsequent sessions were conducted for personnel who were unavailable for the initial indoctrination session.

Site entrance and exit pads, consisting of crushed stone placed on filter fabric, were constructed from the site access gates to the concrete plant slab and concrete decontamination pad, respectively.

Following construction of the entrance pad, the southwestern portion of the concrete plant slab was cleared of minimal surficial debris, leaving a smooth surface. A synthetic liner fabricated from polymer-coated polyester yarn was installed over this area of the slab to provide a clean work area. Two site office trailers were mobilized to the site and located on the synthetic liner. In addition, the existing on-site equipment storage shed was

relocated to the lined area adjacent to the office trailers. Snow fencing was erected around the liner and entrance pad, to define the limits of the Clean Zone.

A temporary Contaminant Reduction Zone was established at the south end of the plant slab to the east of the clean liner to facilitate removal of personnel protective equipment prior to the arrival of the personnel hygiene trailer and decontamination facilities.

Construction of the Phase II interim storage cell, debris containment cell, and wastewater tank containment pad commenced with the cutting of sumps into the existing concrete plant slab. Following removal of the overlying concrete, soil samples were collected from the underlying soil. Concrete and soil removed during construction of the sumps was placed on plastic sheeting on the slab adjacent to the sump and covered. This material was subsequently placed in the interim storage cell following cell completion.

Eight-inch by eight-inch timber curbs were placed around the perimeters of the debris containment cell, wastewater tank containment pad, and Zone 2 soil stockpile, in the locations shown on Plan 2.

Fusing of high density polyethylene (HDPE) underliners for the interim storage cell, debris cell, tank containment pad and the Zone 2 soil stockpile was performed on the clean synthetic liner in the Clean Zone. The HDPE underliner for the interim storage cell was 40-mil in thickness; underliners for all other cells were 60-mil in thickness. All liner seams were vacuum tested and tear tested; all seams were determined to be sound, and no leaks were detected. The underliners for the interim storage cell, debris containment cell, and tank containment pad were then installed in their appropriate areas. The underliner for the Zone 2 soil stockpile was transported to the area designated for the stockpile and left rolled to be installed just prior to excavation of excavation area "B". Installed underliners were temporarily anchored in place with sandbags.

The personnel hygiene trailer and an aluminum change shed for donning personnel protective equipment, arrived on site on February 10, 1988. Power installation to the personnel hygiene trailer and site office trailers was completed on February 11, 1988.

Two 5,000-gallon liquid waste tankers for storage of decontamination wash waters were delivered to the site and set-up on the lined tank containment pad on February 11, 1988. Snow fencing was installed around the tank containment pad and adjacent to the personnel hygiene

trailer to establish the final limits of the Contaminant Reduction Zone.

Temporary snow fencing was installed from the Contaminant Reduction Zone to the north and parallel to the eastern site security fence to define limits between the Working Exclusion Zone and the Restricted Access Exclusion Zone. Snow fencing was also installed in the ravine area outside the site security fence, around the limits of excavation area "A".

On February 15, 1988 the ravine access road leading to excavation area "A" was constructed. The road was constructed by placing a sixteen-foot wide sheet of woven oriented polyethylene sheeting directly on grade. A single layer of filter fabric, and a nominal four inches of crushed stone were then placed on the polyethylene.

A total of five sediment traps and oil absorbent booms, including one temporary sediment trap and oil boom, were installed in the ravine on February 16, 1988, in the locations shown on Plan 2. The temporary trap and boom were removed and placed in the interim storage cell following completion of excavation of contaminated soil in area "A". The sediment traps were constructed of hay bales wrapped in filter fabric, trenched several inches into the ravine bed and secured with steel stakes. Oil absorbent

booms, eight inches in diameter and ten feet in length, consisting of a pervious outer shell with an inner absorbent material, were anchored in place immediately upstream of each sediment trap. Excavated soil removed during construction of the sediment traps was placed in plastic garbage bags and temporarily stored in the Exclusion Zone; this material was placed in the interim storage cell upon cell completion. The sediment trap and oil absorbent boom installed during Phase I were removed from the ravine and wrapped in polyethylene sheeting and placed in the interim storage cell upon cell completion.

The interim storage cell was designated as a temporary clean zone following placement of the underliner. Personnel involved with forming and concrete placement were permitted to enter the area of the cell in Level D protective equipment. On February 17, 1988, placement of wooden forms for construction of the interim storage cell began. At this time, several punctures were discovered in the cell HDPE underliner. These punctures were patched with a heat gun and spare liner material. Concrete for the cell was poured on February 19, 1988. The concrete was covered with plastic sheeting immediately following finishing; the cell was allowed to cure for seven days before any material was placed in it. Trucks delivering concrete to the site entered through the front access gates and travelled over the crushed stone access pad, and were stationed on the synthetic liner in the Clean Zone. Concrete was transferred from the mixer

to a concrete pumper and was subsequently pumped into place in the cell. The use of the concrete pump expedited placement of the concrete and eliminated the need for trucks to travel over the exposed underliner. Concrete trucks exited the site through the Clean Zone and at no time came into contact with contaminated materials, consequently, steam cleaning of the truck tires was not required.

O.H. Materials personnel left the site on February 19, 1988, to allow the concrete sufficient time to cure. Work activities resumed at the site on February 23, 1988.

The general layout of the site, as it appeared during Phase II remedial construction, is illustrated on Plan 2.

3.1.3 Excavation and Securement

3.1.3.1 General

Excavation of contaminated soil was performed in two separate areas outside the site security fence as shown on Plan 2. Excavation area "A" is located in the ravine southeast of the site security fence north of Superior Moving's building; excavation area "B" is located at the northwest corner of Superior Moving's truck parking lot.

3.1.3.2 Excavation Area "A"

Prior to excavation of soil from Area "A", trees and brush located within the areal excavation limits and for an additional five feet beyond those limits were cut a minimum of eighteen inches above grade using chain saws and a hydraulic Caterpillar 215 trackhoe with a grappler head attachment. Trees and brush were loaded directly into dump trucks and transported off site by Global Waste Services of Crawfordsville, for subsequent disposal at Worthington landfill located in Green County, Indiana.

Following removal of trees and brush, miscellaneous debris within the limits of excavation defined for area "A" was removed and transported to the debris containment cell. Debris removed consisted primarily of galvanized steel fence gate pieces, assorted five-gallon plastic pails, and tar paper. The concrete culvert in the existing access road across the ravine at area "A" was also removed and placed in the debris cell. This culvert was not steam cleaned and placed on the plant slab as was originally planned, since it was heavily covered with sediment and broke into smaller pieces when removed, rendering steam cleaning impractical. Debris was removed from area "A" using the Caterpillar 215 trackhoe with a grappler head, operating from the top of the western ravine bank. Debris was loaded directly into the buckets of two Caterpillar 936 and 950

front-end loaders and transported along the top of the western bank of the ravine to the prepared ravine access road, through a temporary breach in the security fence and across the north edge of the existing plant slab to the debris containment cell.

Due to the relatively wet condition of the soil in the ravine area, excavation of area "A" was carried out from the top of the western ravine bank, using the Caterpillar 215 trackhoe. Several large trees were removed from the top of the ravine to provide unencombered access to the ravine during excavation. Above grade portions of the trees, removed from clean areas, were stockpiled on Superior Moving and Storage property for use by the facility owner.

Sediment was excavated from the ravine to an average width of approximately eight feet and a nominal depth of approximately two feet. Excavated material was carefully loaded into the buckets of the Caterpillar 936 and Caterpillar 950 loaders. All equipment operated along the top of the west ravine bank inside the temporary snow fencing. During soil excavation, polyethylene sheeting was placed on the ground underneath the loader buckets to prevent any material that was spilled during loading from coming into contact with the potentially clean material on the bank. Extreme care was taken by equipment operators to virtually eliminate spillage of contaminated material onto the ground;

the loader buckets were filled to approximately one half of the operating capacity. When loaded, the loaders travelled back along the top of the ravine bank to the prepared ravine access road, and into the site through the temporary breach in the security fence.

As excavation of the ditch bottom proceeded downstream, confirmatory soil samples were collected from the exposed in situ soil where excavation was complete. Area "A" was excavated over a period of two days, beginning on February 26, 1988. During evening periods of work stoppage, the breach in the site security fence leading to area "A" was secured to prevent unauthorized entry to the site.

Approximately 140 cubic yards of soil/sediment was removed from excavation area "A" and placed in the interim storage cell. Over the upstream two-thirds of excavation area "A" the underlying material which remained following excavation appeared relatively damp. However, in the downstream portion of the excavation, adjacent to the site security fence, the underlying material appeared saturated.

Following the first day of ravine excavation, approximately 1,000 gallons of water collected in the downstream end of the area excavated up to that time. After consultation with the EPA on-site representative, this water

was pumped via hose around the remaining downstream one-third of excavation area "A", and discharged through the security fence to the existing ravine ditch. The water being pumped had accumulated overnight and appeared clear and free of suspended solids. During pumping, the two most upgradient sediment trap and oil boom combinations were observed to be functioning properly, with water ponding very slightly upstream of the oil booms.

On February 27, 1988, following the completion of excavation in area "A", a 40-mil HDPE overliner was installed over the excavated surface. The liner was anchored upstream of the excavation limit by trenching, and secured along the sides of the excavation with wooden stakes. Wooden struts were nailed to the stakes at grade level to prevent uplifting of the liner. The overliner was installed to follow the grade of the excavated ditch bottom. Following liner installation, the temporary sediment trap and oil boom installed immediately downstream of area "A" were removed along with any accumulated sediment and placed in the interim storage cell.

3.1.3.3 Excavation Area "B"

Prior to commencing excavation of contaminated soil in excavation area "B", a portion of the

site security fence at the east side of the site, adjacent to the northwest corner of Superior Moving's parking lot, was dismantled.

Temporary snow fencing was erected in the parking area immediately outside the excavation limits defined for area "B", and was tied in to meet with areas of the site security fencing which did not require dismantling.

Excavation area "B" was further divided into three sub-areas; B1, B2, and B3. Each sub-area was in turn divided into two excavation depth zones, Zone 1 and Zone 2, based on the known depth of contamination in each sub-area. Zone 1 for areas B1, B2, and B3 was from the original ground surface to depths of 1.0 feet, 3.5 feet, and 1.5 feet, respectively. Zone 2 for the sub-areas comprised the next one foot of soil underlying depth Zone 1. The total depth of material removed from areas B1, B2, and B3 was 2.0 feet, 4.5 feet, and 2.5 feet, respectively. Material excavated from Zone 1 was placed directly in the interim storage cell; material excavated from Zone 2 was placed in a separate HDPE lined stockpile located in the field area to the north of the pumphouse, as shown on Plan 2.

It was anticipated that the Zone 2 soil could be free of contamination, and was therefore kept separate from the Zone 1 soil. Analytical results for two samples collected from the Zone 2 soil stockpile showed PCB concentrations of 320 ppm and 420 ppm. The analytical results for the two samples are presented in the "Phase II Sampling and Analysis Report" for the site.

Excavation of area "B" commenced on February 27, 1988. All material was excavated using the trackhoe and was loaded directly into the two rubber tired loaders and transported to either the interim storage cell or the Zone 2 stockpile, as appropriate. The top one foot of material in Zone 1, comprised of soil and several inches of crushed stone, was excavated and stockpiled in the southeast corner of the storage cell, and was covered with plastic sheeting in order to segregate this soil from the remaining Zone 1 soil to be placed in the cell. The remaining soil from Zone 1 was placed with the sediment excavated from area "A".

Following segregation of the material in the top one foot of Zone 1, excavation and placement of the remaining Zone 1 material in the cell began. The soil/sediment removed from area "A" was generally quite wet, consequently, material excavated from area "B" could not be placed on top of it without causing displacement of the underlying soil. When the dry Zone 1 material was placed on top of the wet area "A" material, the mound slumped out horizontally towards the edges of the cell. Mixing of the Zone 1 material with the wet area "A" material did not effectively solidify the pile, and it became necessary to solidify the pile by adding Portland cement. On March 1, 1988, twenty five tons of dry Portland cement was delivered to the site and mixed into the pile with the trackhoe. The

pile stabilized satisfactorily, and the remaining material from Zone 1 was stockpiled with no additional problems.

Until solidification operations were completed, it was not feasible to place additional material from area "B" into the cell. In order to minimize the time that Superior Moving's parking lot was out of service, the remaining Zone 1 material was excavated and placed on polyethylene sheeting immediately west of the Phase I interim storage cell. Following solidification of the wet material, the area "B" material temporarily stored on polyethylene was picked up with the loaders and transported to the Phase II storage cell.

Soil excavated from Zone 2 of area "B" was stockpiled in a lined cell located to the north of the pumphouse.

All excavation work in area "B" was carried out to the areal and vertical excavation limits as shown on Plan 2. Approximately 720 cubic yards of soil was removed from area "B".

Following completion of excavation of Zone 2 material in each of the area "B" sub-areas, confirmatory soil samples were collected from the remaining in situ soils. Confirmatory sample results are presented in the "Phase II Sampling and Analysis Report" for the site.

The excavation pit was then lined with a 60-mil HDPE underliner and backfilled with clean sand fill. Prior to backfilling, the sand fill was sampled and submitted for PCB analysis. The results of the analysis show that no PCBs were detected; a copy of the analytical data is presented in Appendix C.

A 60-mil HDPE overliner was installed over top of the backfill, creating a sealed "pocket". Vertical sections of plastic pipe were installed at locations in the backfilled area to allow fence posts to be re-set. The sections of plastic pipe were fitted with HDPE collars, which were in turn fused to the excavation area overliner to provide a watertight seal. All horizontal seams in the backfill underliner and overliner were vacuum tested, and repaired as necessary to correct any leaks. Vertical seams were inspected visually and were found to be satisfactory. Upon completion of installation and testing of the overliner, a geotextile fabric was placed over the liner followed by placement of a nominal six inches of crushed stone to bring the backfilled area up to original grades. The northernmost fifty feet of the backfilled area was covered with clean sand to match original conditions of the ground prior to excavation. The site security fence was re-constructed in its original location, following surface restoration of area "B". All excavation, backfilling, surface restoration, and security fence reconstruction was completed by March 6, 1988.

During the period of February 27, 1988 to March 6, 1988, while the site security fence adjacent to area "B" was dismantled, a security guard was stationed at the site to provide security during all non-working hours.

3.1.4 Pumphouse Well Dismantling and Securement

On February 19, 1988, the vertical turbine pump in the site pumphouse was removed, and the well secured to allow future testing and sampling.

A Case 580E backhoe was used to remove the pumphouse roof and place it on the ground adjacent to the pumphouse. The roof was placed in the interim storage cell upon cell completion.

Prior to dismantling the pump, the discharge head assembly and immediate vicinity of the pumphouse floor were cleared of debris and foreign materials which could potentially fall into the well.

The discharge head assembly, motor, and motor base were disconnected and removed from the pumphouse. The turbine pump and downhole components were then removed from the well. All pump assembly parts were transported to the decontamination pad where they were steam cleaned and wrapped in polyethylene sheeting prior to wipe sampling.

The well was secured by installing a steel pipe section over the dismantled well and anchoring it in concrete. A removable lockable cap was then installed on top of the pipe section.

During pump dismantling and securement activities, extreme care was taken to prevent any foreign matter from entering the well.

On May 4, 1988, a complete well volume of water was removed from the well by air-lifting, and the well was subsequently sampled. An inflatable packer was not used to bail the well water as was proposed in the Phase II RAWP, due to operational problems with the packer. Details of the well sampling are provided in the report entitled "Phase II Hydrogeological Investigation, Former P.R. Mallory Plant Site, Crawfordsville, Indiana".

3.1.5 Delineation of Underground Pipes

Test pits and test trenches were excavated to delineate the depth and alignment of four previously identified pipes discharging to the ravine, and one additional pipe detected during excavation of area "A".

During delineation of pipes located outside the site security fence and in clean areas of the site, excavated material was placed on plastic sheeting on the ground immediately adjacent to the excavation. Following excavation, material was backfilled in reverse order to restore the area to its original condition.

During delineation of pipes located in contaminated zones within the site security fence, the top one foot of material was excavated and placed on the ground immediately adjacent to the hole. Underlying material was then excavated and placed on a sheet of polyethylene. Excavated material was backfilled in reverse order to restore the area to its original condition.

Soil samples were collected from the bedding material underlying the pipes at two of the test pit excavations; the sample locations are shown on Plan 3.

The locations of all test pits are shown on Plan 2.

Two pipes were located in a trench excavated north of Superior Moving and Storage and adjacent to the ravine (TT3). The pipes were installed side by side and consisted of a 2-inch diameter black fiber pipe and a 4-inch diameter clay tile pipe. The pipes appeared to originate from the Mallory Site and discharge into a 6-inch diameter CMP located in the ravine. The clay tile pipe was found in TT1 immediately inside the site security fence. The fiber pipe was not located within the site fence before excavation activities were discontinued. All exposed pipes were plugged with a cement grout before backfilling of the trenches.

An exposed CMP located in Superior's parking area was traced towards the ravine until it terminated at grade still within the parking area. The source or purpose of this line was not determined, however, the pipe is currently out of surface and slopes downward to the southwest, suggesting it does not and has not drained anything from the site.

One trench was excavated immediately north of monitoring well OW4B-86 and OW4A-86 to intercept two of the pipes which discharge into the ravine. Both pipes were intercepted in the trench. A clay tile pipe lined with plastic was located at an approximate depth of two feet. A plastic pipe was intercepted at a depth of four feet. Although minimal flow was discharging from the plastic pipe into the ravine, the pipe appeared full when intercepted and an estimated 20 gallons of water collected in the trench. Both pipes appeared to originate from the plant slab and were plugged prior to backfilling of the trench.

Several test trenches were excavated to trace the CMP which discharges into the ravine at the northwest corner of the site.

A cement bell and spigot pipeline extended from the CMP at the top of the ravine and ran southwesterly to the cleared field. The pipe was then found to change

direction and follow the tree line heading towards the pumphouse. The pipe was clean and dry in all test excavations. The pipe was not traced to the pumphouse or slab due to wet surface conditions in these areas. Two soil samples were collected from the bedding material. The pipe was plugged with cement at two locations and all trenches were subsequently backfilled.

Test trenching was discontinued due to the excessively wet ground conditions caused by snow melt. Analytical results for samples collected during the trenching program are presented in the "Phase II Sampling and Analysis Report" for the site.

3.1.6 Site Clean-up, Demobilization and Project Close-out

Following collection of confirmatory soil samples from the Zone 2 stockpile, the stockpile was covered with a single sheet of woven-oriented polyethylene sheeting and anchored in place with sand bags and old tires.

Prior to final securement of the 60-mil HDPE overliner over the debris containment cell, a quantity of metal debris which was removed from the ravine during Phase I construction and had been steam cleaned and left adjacent to the decontamination pad, was transferred to the debris containment cell. The 60-mil overliner was pulled overtop of the debris cell and was anchored in place around the perimeter with sandbags, soil and large pieces of timber.

Following completion of excavation activities and placement of soil in the interim storage cell, drums of soil, water, decontamination fluids generated from cleaning sampling equipment and used personal protective clothing generated during both Phase I and Phase II remedial activities were transported to the cell. In addition, a number of plastic garbage bags containing used personal protective clothing generated during Phase II activities were also placed in the cell. A complete summary of all drummed and bagged wastes and their storage location on site is presented in Table 1.

Following placement of all designated material in the interim storage cell, a 60-mil HDPE overliner was installed over the cell. Two factory-joined panels of 60-mil liner approximately 45 feet in width and 110 feet in length were laid out and fused together on the existing liner in the Clean Zone. Ten workers manually pulled the liner over approximately sixty percent of the cell. One of the loaders was then used to assist in pulling the liner over the remainder of the cell. The outer edge of the overliner extends approximately five feet beyond the perimeter curb of the storage cell, and was secured in place with sandbags and tires.

Temporary snow fencing erected around excavation area "A" prior to excavation activities, was left

TABLE 1

SUMMARY OF DRUMMED WASTES CONTAINED ON SITE

DRUM NUMBER	CONTENTS	DATE FILLED	STORAGE LOCATION	SOURCE	SAMPLE NUMBER
1	PPE	Dec. 8/86	Phase I Cell	Sevenson	--
2	PPE	Dec. 8/86	Phase I Cell	Sevenson	--
3	PPE	Dec. 9/86	Phase I Cell	Sevenson	--
4	PPE	Dec. 10/86	Phase I Cell	Sevenson	--
5	PPE	Dec. 11/86	Phase I Cell	Sevenson	--
6	PPE	Dec. 13/86	Phase I Cell	Sevenson	--
7	Capacitors	Dec. 13/86	Phase I Cell	Sevenson	--
8	Capacitors	Dec. 13/86	Phase I Cell	Sevenson	--
9	Capacitors	Dec. 13/86	Phase I Cell	Sevenson	--
10	PPE	Dec. 17/86	Phase I Cell	Sevenson	--
11	Capacitors	Dec. 14/86	Phase I Cell	Sevenson	--
12	Capacitors	Dec. 14/86	Phase I Cell	Sevenson	--
13	Capacitors	Dec. 14/86	Phase I Cell	Sevenson	--
14	Capacitors	Dec. 14/86	Phase I Cell	Sevenson	--
15	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
16	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
17	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
18	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
19	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
20	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
21	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
22	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
23	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
24	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
25	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
26	Capacitors	Dec. 18/86	Phase I Cell	Sevenson	--
27	PPE	Dec. 19/86	Phase I Cell	Sevenson	--
28	PPE	Dec. 19/86	Phase I Cell	Sevenson	--
29	PPE	Dec. 19/86	Phase I Cell	Sevenson	--
30	PPE	Dec. 21/86	Phase I Cell	Sevenson	--
31	PPE	Dec. 21/86	Phase I Cell	Sevenson	--
32	PPE	Dec. 22/86	Phase I Cell	Sevenson	--
33	PPE	Dec. 23/86	Phase I Cell	Sevenson	--
34	PPE	Jan. 5/87	Phase I Cell	Sevenson	--

continued....

SUMMARY OF DRUMMED WASTES CONTAINED ON SITE

DRUM NUMBER	CONTENTS	DATE FILLED	STORAGE LOCATION	SOURCE	SAMPLE NUMBER
35	PPE	Jan. 6/87	Phase I Cell	Sevenson	--
36	PPE	Jan. 6/87	Phase I Cell	Sevenson	--
37	PPE	Jan. 7/87	Phase I Cell	Sevenson	--
38	PPE	Jan. 8/87	Phase I Cell	Sevenson	--
39	PPE	Jan. 9/87	Phase I Cell	Sevenson	--
40	PPE	Jan. 11/87	Phase I Cell	Sevenson	--
41	PPE	Jan. 11/87	Phase I Cell	Sevenson	--
42	Sediment from decontamination pad	Jan. 11/87	Phase I Cell	Sevenson	--
43	PPE	Jan. 11/87	Phase I Cell	Sevenson	--
44	Sediment from decontamination pad	Jan. 11/87	Phase I Cell	Sevenson	--
45	PPE	Jan. 11/87	Phase I Cell	Sevenson	--
G1	Soil cuttings, Well OW1A-86	Dec. 11/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)
G2	Soil cuttings, Well OW1A-86	Dec. 11/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)
G3	Soil cuttings, Well OW1A-86	Dec. 12/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)
G4	Soil cuttings, Well OW1A-86	Dec. 12/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)
G5	Soil cuttings, Well OW1A-86	Dec. 13/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)
G6	Soil cuttings, Well OW1A-86	Dec. 13/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)
G7	Soil cuttings, Well OW1A-86	Dec. 13/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)
GL1	Liquids, Well OW1A-86	Dec. /86	Plant Slab	Geotech.	GL1
GPP1	PPE	Dec. 14/86	Phase I Cell	Geotech.	--
G8	Soil cuttings, Well OW1A-86				GS1 GS2 (Dup.)
G9	Soil cuttings, Well OW1B-86	Dec. 16/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)
G10	Soil cuttings, Well OW1B-86	Dec. 16/86	Phase II Cell	Geotech.	GS1 GS2 (Dup.)

continued....

SUMMARY OF DRUMMED WASTES CONTAINED ON SITE

DRUM NUMBER	CONTENTS	DATE FILLED	STORAGE LOCATION	SOURCE	SAMPLE NUMBER
GL2	Water generated during drilling, Well OW2-86	Dec. 15/86	Plant Slab	Geotech.	GL1
GL3	Water generated during drilling, Well OW5-86	Dec. 15/86	Plant Slab	Geotech.	GL1
GL4	Water and grout generated during drilling, Well OW1A-86	Dec. 15/86	Plant Slab	Geotech.	GL1
GPP2	PPE	Dec. 16/86	Phase I Cell	Geotech.	--
GPP3	Tarpaulins	Dec. 16/86	Phase I Cell	Geotech.	--
G11	Soil cuttings, Well OW2-86	Dec. 16/86	Phase II Cell	Geotech.	GS3
G12	Soil cuttings, Well OW2-86	Dec. 16/86	Phase II Cell	Geotech.	GS3
G13	Soil cuttings, Well OW2-86	Dec. 16/86	Phase II Cell	Geotech.	GS3
GL5	Water and grout wash, Well OW2-86	Dec. 16/86	Plant Slab	Geotech.	GL2
G14	Soil cuttings, Well OW5-86	Dec. 17/86	Zone 2 Stockpile	Geotech.	GS4
G15	Soil cuttings, Well OW5-86	Dec. 17/86	Zone 2 Stockpile	Geotech.	GS4
G16	Soil cuttings, Well OW5-86	Dec. 18/86	Zone 2 Stockpile	Geotech.	GS4
G17	Soil cuttings, Well OW5-86	Dec. 18/86	Zone 2 Stockpile	Geotech.	GS4
GL6	Water and grout wash, Well OW5-86	Dec. 17/86	Plant Slab	Geotech.	GL3
Nine Drums	Well development waters	Dec. 1986	Tanker	Geotech.	--
Eight Drums	Sediment from decontamination pad or PPE	Dec. 1986	Phase I Cell	Geotech.	--
Two Drums	Well development waters or PPE	Dec. 1986	Phase II Cell	Geotech.	--
Two Drums	PPE	May 1987	Phase II Cell	CRA	--
One Drum	PPE and used oil boom	May 1987	Phase II Cell	CRA	--
One Drum	Spent solvents and water from sampling equipment decontamination	Dec. 1986/ May 1987	Phase II Cell	CRA	--
Two Drums	PPE	Oct. 1987	Phase II Cell	CRA	--
87-1	Several capacitors, one used oil boom	July 1987	Phase II Cell	CRA	--
87-2	Soil auger cuttings from power pole installation at Terra Products	Summer 1987	Phase II Cell	Terra Prod.	--

continued....

SUMMARY OF DRUMMED WASTES CONTAINED ON SITE

DRUM NUMBER	CONTENTS	DATE FILLED	STORAGE LOCATION	SOURCE	SAMPLE NUMBER
88-1	Soil cuttings, Borehole BH8-88	Feb. 1988	Phase II Cell	ATEC	--
88-2	Soil cuttings, Borehole BH8-88	Feb. 1988	Phase II Cell	ATEC	--
88-3	Soil cuttings, Borehole BH8-88	Feb. 1988	Phase II Cell	ATEC	--
88-5	Soil cuttings, Well OW7-88	Feb. 1988	Phase II Cell	ATEC	--
88-6	Soil cuttings, Well OW7-88	Feb. 1988	Phase II Cell	ATEC	--
88-7	Soil cuttings, Well OW7-88	Feb. 1988	Phase II Cell	ATEC	--
88-8	Soil cuttings, Well OW7-88	Feb. 1988	Phase II Cell	ATEC	--
88-9	Water, Well OW6-88	Feb. 1988	Phase II Cell	ATEC	--
88-10	Soil cuttings, Well OW6-88	Feb. 1988	Phase II Cell	ATEC	--
88-11	Soil cuttings, Well OW6-88	Feb. 1988	Phase II Cell	ATEC	--
88-12	Sediment from decontamination pad	Feb. 1988	Phase II Cell	O.H.M.	--
88-13	Sediment from decontamination pad	Feb. 1988	Phase II Cell	O.H.M.	--
88-14	Sediment from decontamination pad	Feb. 1988	Phase II Cell	O.H.M.	--
Two Drums	Sediment from decontamination pad	March 1988	Plant Slab	O.H.M.	--
One Drum	PPE	March 1988	Plant Slab	CRA	--
One Drum	Spent solvents and water from sampling equipment decontamination, 50% full	Oct. 1987/ March 1988	Loading Dock	CRA	--
One Drum	5 gallon pail of hexane, 50% full 5 gallon pail of methanol, 50% full	---	Plant Slab	---	--
One Drum	5 gallon pail of acetone, 50% full 5 gallon pail of 1,1,1-TCA, 50% full	---	Plant Slab	---	--
Approx. 40 plastic garbage bags	PPE	Feb. 1988	Phase II Cell	O.H.M.	--
Approx. 10 plastic garbage bags	PPE	April 1988	Plant Slab	---	--

Notes:

Sevenson - indicates Sevenson Environmental Services; Phase I remedial construction contractor
Geotech. - indicates Geotechnology Inc.; Phase I contractor for monitoring well installation
O.H.M. - indicates O.H. Materials Corp.; Phase II remedial construction contractor
ATEC - indicates ATEC Associates Inc.; Phase II contractor for monitoring well and borehole installation

in place, and a barricade was erected to prevent unauthorized entry to the lined excavation area.

All vehicles and equipment involved in construction activities were decontaminated by steam cleaning before being removed from the site. Throughout the Phase II remedial activities, decontamination wash waters were pumped from the decontamination pad sump to the on-site storage tankers on an as-required basis. Sediment which accumulated on the pad was removed on a regular basis and placed in drums to provide a clean decontamination surface. Nine drums containing well development waters generated during Phase I well installation activities were also pumped into the waste tankers. A total of approximately 10,000 gallons of water was generated during Phase II remedial activities. The material contained in the waste tankers was subsequently transported to the SCA Chemical Services incinerator in Chicago for destruction. One tanker was removed from site on May 23, 1988, the other was removed on May 25, 1988. Certificates of destruction are provided in Appendix A.

Mobilization and project close-out activities included the steam cleaning of equipment and tools, final securement of all soil storage cells, permanent securement of the synthetic liner over the Clean Zone, and cleaning and subsequent removal of the personnel hygiene trailer, change shed, and office trailers from the site. All O.H. Material

personnel and equipment, with the exception of the office trailers and the two wash water storage tankers were demobilized from the site by March 7, 1988. The office trailers were removed from site on March 9, 1988. CRA personnel remained on site until March 14, 1988 to collect various investigative soil samples and wipe samples from the steam cleaned pump assembly parts. Analytical results for all samples collected are presented in the "Phase II Sampling and Analysis Report".

On March 11, 1988, a project closeout meeting was held at the site to inform local authorities of the locations and contents of the various covered soil stockpiles, the debris containment cell, and the various drummed wastes stored on site. Present at the meeting were representatives of CRA, EPA, Crawfordsville Fire Department, Crawfordsville Police Department, Montgomery County Health Department, Civil Defence, and the Mayor of Crawfordsville.

Weekly inspections of the site are being made to ensure all liner installations and covers are secure and that all sediment traps and oil booms are in place. The weekly inspections are being conducted from outside the security fence. Inspectors will not enter the site to conduct inspections or carry out work unless accompanied by at least one other qualified person. Agency officials shall be contacted if any disturbances are noted and before any additional site work is performed.

3.1.7 On-Site Observers

A representative of the EPA was on site during all major construction activities, well and borehole installations and sampling. On-site representatives included Ms. Linda Bohling (February 10 to 25, 1988) and Mr. Jim Myers (February 25, 1988 to March 11, 1988) of Metcalf and Eddy.

Ms. Greta Hawvermale, Project Coordinator for IDEM, and Mr. Jim Murray, Project Manager for IDEM attended the health and safety indoctrination meeting at the site on February 8, 1988. In addition, Mr. Jim Murray visited the site on March 1, 1988 and March 11, 1988.

3.1.8 Post Close-Out Remedial Activities

3.1.8.1 General

During a post-construction inspection conducted on April 11, 1988, representatives of CRA observed that the Phase II interim storage cell overliner had been torn along what appeared to be several factory-fused seams, exposing the underlying soil. It appeared that high winds in the area the previous week may have caused the liner to tear. A crew from O.H. Materials and CRA was mobilized to the site the next day to install a temporary visqueen cover over the

area of exposed soil, as an interim measure while preparing to repair the HDPE liner. Several days after the temporary overliner was installed, high winds again loosened the temporary liner, exposing underlying soil. A crew from O.H. Materials was again mobilized to the site to install another temporary cover.

All work was carried out in accordance with the approved site Health and Safety Plan.

3.1.8.2 Repair of Phase II Interim Storage Cell Overliner

Crews from CRA and O.H. Materials mobilized to the site again on Monday, April 25, 1988. On Tuesday, April 26, 1988, personnel from Staff Industries and National Seal (subcontractor to O.H. Materials) arrived on site, and commenced repair of the overliner.

Upon closer inspection of the torn liner, it was observed that the liner had torn along four adjacent factory-fused seams, each seam approximately six feet apart. The tears appeared to originate at locations approximately ten feet east of the western curb of the cell. The tears extended to the east along the entire length of the cell; the remaining tears extended to about ten feet from the eastern curb of the cell.

The torn HDPE liner was cut into small sections and completely removed from the cell. A temporary visqueen liner was immediately installed over the cell. The HDPE liner sections were placed on the ground surface in the relatively flat area to the west of the Phase I interim storage cell, in their appropriate location. Due to the windy weather conditions, it was necessary to weight the liner section down with sandbags and old tires prior to fusing them together. The smaller liner sections were fused together in their appropriate locations to form two separate, large liner sections, each approximately 90 feet by 55 feet.

The temporary visqueen cover was removed from the cell, an a small bulldozer was used to level the mounds of soil to provide a generally flat, smooth surface on top. The bulldozer was then used to pull one of the large liner sections over the eastern half of the cell. The other large liner section was manually pulled over the western half of the cell with the assistance of a pickup truck operating from the Clean Zone. The two large liner sections were then fused together in place over top of the storage cell. The liner was then secured around the perimeter using sandbags and clean imported crushed stone.

3.1.8.3 Additional Delineation of Underground Pipes

On April 30, 1988, while crews were at the site to repair the Phase II cell overliner, additional test trenches were excavated to continue delineation of underground pipes previously discontinued due to excessively wet ground conditions.

All pipe delineation work performed at this time was carried out in the Exclusion Zone. During excavation, the upper layer of soil, where contamination was known to exist, was placed directly on the ground adjacent to the excavation. Underlying material was then excavated and placed on a sheet of polyethylene. Excavated material was backfilled in reverse order to restore the area to its original condition.

Test trenches TT7 and TT8 were excavated north of the site pumphouse and north of the former plant loading dock, respectively. A cement pipe was located in each trench, at an approximate depth of three feet; soil samples were collected from the bedding underlying each pipe. Based on the location of these pipes, and the fact that the same type of cement pipes were located at the trenches previously excavated north of the Zone 2 soil stockpile, it was concluded that the drain located in the center of the plant loading dock eventually discharges to the ravine via

the 18-inch diameter CMP adjacent to the security fence at the north end of the site.

Test trenches were excavated along the south side of the plant loading dock, and at locations along the north and south edges of the plant slab. Trenches were excavated to a depth of approximately five feet. No pipes were found at these locations.

Excavation of test trench TT13 revealed underground pipes at two locations, three feet below grade. The concrete-clay pipes (TT13B) appeared to be in alignment with the clay pipes located at previously excavated test trench TT1. The concrete pipe located at test trench TT13A appeared to be in alignment with the southernmost excavation limit at excavation area "A".

Soil samples were collected from the bedding underlying each of these pipes. Analytical results for all samples collected are presented in the "Phase II Sampling and Analysis Report".

All pipes located during this test trenching work were fractured by the backhoe bucket. The pipe located at test trench TT8 was plugged with cement at both the upgradient and downgradient ends. The other pipes located were plugged only on the upgradient ends.

During excavation of a test pit for soil sampling at sample site number 30, a number of buried capacitors, wood and metal debris were uncovered at a depth of approximately six feet beneath the ground surface. Test trenches TT10 and TT11 were excavated in an attempt to define the limits of this apparent buried disposal area, and to possibly locate additional buried pipes in the area.

Capacitors and debris were encountered at a depth of approximately three feet, at the northernmost end of TT10. Test trench TT11 was excavated to a depth of approximately six feet; no buried capacitors or debris were uncovered. No underground pipes were exposed at either test trench.

3.2 SITE SAMPLING PROGRAM

3.2.1 General

Concurrent with Phase II construction activities, a sampling and analysis program was undertaken at the plant site in accordance with the approved Phase II Response Action Work Plan.

Confirmatory samples were collected from the exposed surfaces of excavated areas to identify any remaining

residual contamination. Additional confirmatory samples were collected from the soil transported to the Zone 2 stockpile, pump assembly parts, and from the wash water tankers to determine the appropriate disposition for this material. Investigative samples for additional site characterization were collected from the following areas:

i) bedding from several underground pipelines identified and delineated by excavation;
ii) surficial soils below the discharge from various pipes draining into the ravine;
iii) test pits excavated within areas of known contamination around the former plant yard;
iv) the ravine creek bottom;
v) the former water supply well;
vi) existing observation wells; and
vii) Terra's and Superior's water supply wells.

The sample locations are identified on Plan 3. The Sampling and Analysis Program is presented in a separate report entitled, "Phase II Sampling and Analysis Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana". The report includes details of sampling protocols, decontamination protocols, variations from the RAWP, analytical results, Quality Assurance and Quality Control (QA/QC) results and a general QA/QC overview.

3.3 HYDROGEOLOGICAL INVESTIGATION

Concurrent with Phase II construction activities, additional hydrogeological investigation was carried out. In addition to collection of a third round of water samples from the seven existing on-site observation wells and from Terra's and Superior's wells, two new shallow observation wells were installed and sampled. The site pumphouse well was also sampled. A borehole was drilled adjacent to the existing well to obtain soil samples for geologic record. Details of the well and borehole installations, and all well sampling activities are presented in a report submitted under separate cover, entitled, "Phase II Hydrogeological Investigation, Former P.R. Mallory Plant Site, Crawfordsville, Indiana".

4.0 HEALTH AND SAFETY

4.1 GENERAL

Due to the potentially hazardous nature of the known on-site contaminants, a stringent Health and Safety program was implemented during Phase II Remedial Action. The Health and Safety Program was implemented in accordance with the guidelines established in the Phase II Response Action Work Plan. Mr. Tim Rittgers of O.H. Materials was the on-site Health and Safety Officer for all Phase II construction activities.

On February 8, 1988, prior to any site activities, Mr. Dave Mummert, a Certified Industrial Hygienist with O.H. Materials, conducted a site health and safety indoctrination session. During the session, personnel were informed of the potential hazards associated with the work; personnel were also trained in the use of personnel protective equipment and proper personal hygiene practices. Additionally, workers were made aware of on-site contingency plans, general safety protocols and security procedures required during remedial activities. Additional personnel who arrived on the site while work was in progress were given similar Health and Safety training sessions on an individual basis.

All personnel working on site were required to have had full medical surveillance within two months preceding entry to the site. Medical surveillance performed was consistent with the approved Phase II RAWP.

4.2 WORK AREAS

Prior to commencing any on-site activities, snow fencing was erected to identify the Exclusion Zone, Contaminant Reduction Zone and the Clean Zone.

4.3 DEVELOPMENT OF OFF-SITE EMERGENCY CONTINGENCY AND RESPONSE PLAN

An off-site contingency planning meeting was held on January 27, 1988 with representatives of CRA, Crawfordsville Fire Department, Crawfordsville Police Department, Civil Defense, Indiana State Police, the local Conservation Officer, the Mayor of Crawfordsville, Montgomery County Health Department, IDEM, and O.H. Materials.

The purpose of the meeting was to:

a) Introduce site personnel to local authorities;

b) Review the history of the site and work completed to date;

c) Review the work plan for Phase II remedial activities;

d) Identify materials and contaminants being handled or found at the site; and

e) Identify potential hazards and emergency situations which may occur and which local emergency personnel may be required to respond to; and to identify procedures to be followed by on-site personnel and emergency personnel in response to an emergency situation.

Phone numbers and contacts were recorded for each agency and a chain of command was established to determine who would direct and coordinate activities and personnel in the event of an emergency.

Staff of Culver Union Hospital were unable to attend the meeting. Staff were advised that site work was about to commence and were prepared to respond to an incident in accordance with protocols discussed prior to Phase I.

On February 25 and 27, 1988 fire fighters and ambulance crews from Crawfordsville Fire Department visited the site and were given a general site tour. The purpose of

the tour was to familiarize emergency crews with the site, in case they were required to respond to an accident.

4.4 PERSONAL PROTECTIVE EQUIPMENT AND ON-SITE AIR MONITORING

4.4.1 General

Personnel entering the Exclusion Zone were equipped with Level C protective gear, as outlined in the RAWP, including Saranex-coated, full coverage tyvek coveralls and full facepiece air purifying respirators with approved cartridges.

Fixed-media air monitoring for total suspended particulates (TSP) was completed on a daily basis during all active site excavation and soil handling. Sampling pumps were placed along the site perimeter and on the maximum risk worker during excavation. Additionally, direct readout monitoring for organic vapors, total dust, air oxygen content, and explosive gases was conducted on a routine basis during excavation activities.

Air monitoring data collected by the Health and Safety Officer is presented in Appendix B.

4.4.2 Fixed-Media Air Monitoring

Fixed-media air monitoring was carried out using Gillian Personal Monitoring air sampling pumps, fitted with filter cassettes for total suspended particulates (TSP) and PCBs.

A total of twenty four samples (excluding field blanks) were collected from locations downwind of excavation or soil handling activities and were analyzed for TSP. Of these samples, seven showed an excursion of 150 ug/m^3 TSP or greater between the upwind and downwind sample and were subsequently analyzed for PCBs. In two cases, PCBs were detected, however, the total PCB concentrations were quite low at 1.3 ug/m^3 and 1.8 ug/m^3. In the other five samples, PCBs were not detected. Detection limits for these samples ranged from 0.4 ug/m^3 to 9 ug/m^3.

Based on the time weighted average (TWA) exposure limits of 500 ug/m^3 (54 percent chlorine) and 1,000 ug/m^3 (42 percent chlorine) established by the Occupational Safety and Health Administration (OSHA) for PCBs in air, the site remediation work did not cause significant exposure to on-site personnel, the general public or the environment.

Sample number 5676-088, located on the designated maximum risk worker showed a TSP concentration of 15,390 ug/m^3 as compared to the upwind sample which showed a TSP concentration of 30 ug/m^3. This sampling pump was placed on two different workers at various times during the day, during excavation and handling of soil from area "B", and during solidification of the wet material in this interim storage cell. It is believed that the high TSP reading of this sample is due to the exposure to the dry Portland cement being blown into the interim storage cell during soil stabilization. Although the TSP concentration for this sample exceeds the exposure limit of 15,000 ug/m^3 TSP established by OSHA, all workers were wearing air-purifying respirators equipped with particulate/organic vapor cartridges. Consequently, no personnel were exposed to excessive TSP.

4.4.3 Direct Readout Air Monitoring - Organic Vapors, Total Dust, Oxygen Content, Explosive Gases

During excavation and soil handling activities, a photoionization detector (PID) was used to monitor for organic vapors. Monitoring was carried out from around the perimeter security fence. Results show that in all cases, organic vapors at the perimeter fence were within background levels of 0.2 to 0.4 parts per million (ppm).

A mini-real-time aerosol monitor (Mini-RAM) was used to monitor TSP. The Mini-RAM was placed on the perimeter fence downwind of soil excavation activities. Monitoring results show downwind time-weighted average (TWA) TSP concentrations in the range of 0.0 to 270 ug/m^3. These results are well within the TSP exposure limit of 15,000 ug/m^3 as established by OSHA.

Surveys of the air oxygen content and lower explosive limit (LEL) were carried out from the perimeter fence during excavation and soil handling activities. An MSA Portable Combustible Gas and O_2 meter was used for the monitoring. Results show that in all cases, the oxygen content in the air was normal, and the LEL reading was also normal at 0.0%. During dismantling of the pumphouse well, oxygen content and LEL was monitored from within the pumphouse and around the well casing. The oxygen content was normal and the LEL was 0.0%.

APPENDIX A

WASTE MANIFEST FORMS AND CERTIFICATES OF DESTRUCTION - WASTEWATER

STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY DIVISION OF LAND POLLUTION CONTROL

2200 CHURCHILL ROAD, SPRINGFIELD, ILLINOIS 62794-9276 (217) 782-6761
P.O. BOX 19276

LPC-0610
LPC 62 8/81

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) IEPA Form 8700-22 (Rev. 9-88) Form Approved OMB No. 2050-0039, Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.	IND 981526387
Manifest Document No.	00003
2. Page 1 of 1	
Information in the shaded areas is not required by Federal law, but is required by Illinois law.	
3. Generator's Name and Mailing Address	DURACELL INTERNATIONAL C/O KRAFT, INC. ONE KRAFT COURT, GLENVIEW, ILLINOIS, 60025
4. Generator's Phone	312 998-3307
A. Illinois Manifest Document Number	IL 2034411
B. Illinois Generator's ID	0311810758193
5. Transporter 1 Company Name	BUFFALO FUEL CORPORATION
6. US EPA ID Number	[illegible]
C.	[redacted]
D. Transporter's Phone	[illegible]
7. Transporter 2 Company Name	N/A
8. US EPA ID Number	
E. Illinois Transporter's ID	
F. ( ) Transporter's Phone	
9. Designated Facility Name and Site Address	SCA CHEMICAL SERVICES 11700 S. STONY ISLAND AVENUE CHICAGO, ILLINOIS 60617
10. US EPA ID Number	ILD000672121
G. Illinois Facility's ID	0311600058
H. Facility's Phone	(312) 646-5700

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. NON-HAZARDOUS RINSE WATER	001	TT	ESTIMATED [illegible] 5197	1	EPA HW Number: N/A Authorization Number: 0[illegible]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above in Item 14: 1 = Gallons 2 = Cubic Yards

15. Special Handling Instructions and Additional Information

SCA WORK ORDER # 88-1495 SITE: 3900 STATE ROAD 38 EAST [illegible], IN

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Date (Month Day Year)
HOMER G. WILSEK	[signature]	05 17 88

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)
Thomas Curtis	[signature]	05 23 88

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)

19. Discrepancy Indication Space — Recd Part 5 - Forwarded to IEPA. # Recd 5197 gal [illegible]

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Date (Month Day Year)
Darlene J. Cozzone [illegible]	[signature]	05 23 88

IEPA 217 / 782-3637 "24 HOUR EMERGENCY AND SPILL ASSISTANCE NUMBERS" OUTSIDE ILLINOIS 800 / 424-8802 or 202 / 426-2675

DISTRIBUTION: PART 1 GENERATOR PART 2 IEPA PART 3 FACILITY PART 4 TRANSPORTER PART 5 IEPA PART 6 GENERATOR

[illegible]

EPA ID #ILD000672121
ILL. ID #0316000058

SCA CHEMICAL SERVICES

CERTIFICATE No 014843

Certificate of Destruction

SCA Chemical Services Inc. has incinerated waste received from Duracell International as identified on manifest number IL2034411 at its Chicago Incineration facility and hereby certifies such destruction as of this 26 day of May 198 8.

Generator Duracell International
c/o Kraft Inc.
Address 4W Kraft Court
Glenview, Il 60025

Contact Romer Wilsek

By Jose Luque
Operations Coordinator
Title

88-1495

STATE OF ILLINOIS ENVIRONMENTAL PROTECTION AGENCY DIVISION OF LAND POLLUTION CONTROL

2200 CHURCHILL ROAD, SPRINGFIELD, ILLINOIS 62794-9276 (217) 782-6761
P.O. BOX 19276

IL532-0610
LPC 62 8/81

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: IND 981526387 — Manifest Document No.: 00004
2. Page 1 of 1
Information in the shaded areas is not required by Federal law, but is required by Illinois law.

A. Illinois Manifest Document Number: IL 2034412

3. Generator's Name and Mailing Address:
DURACELL INTERNATIONAL
C/O KRAFT, INC.
4W KRAFT COURT, GLENVIEW, ILLINOIS 60025

4. Generator's Phone: 312 998-3307

B. State Generator's ID: [redacted]

5. Transporter 1 Company Name: BUFFALO FUEL CORPORATION
6. US EPA ID Number: NYD[redacted]

C. State Transporter's ID: [redacted]
D. Transporter's Phone

7. Transporter 2 Company Name: N/A
8. US EPA ID Number

E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address:
SCA CHEMICAL SERVICES
11700 S. STONY ISLAND AVENUE
CHICAGO, ILLINOIS 60617

10. US EPA ID Number: ILD000672121

G. State Facility's ID: 0311160080518
H. Facility's Phone: 312 646-5700

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. NON-HAZARDOUS RINSE WATER Less than 50 ppm PCB	001	TT	#4800	1	XX
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above [illegible]

K. Handling Codes for Wastes Listed Above [illegible] 2 = Cubic Yards

15. Special Handling Instructions and Additional Information

SCA WORK ORDER # 88-1496

Pick up site Kraft Rt. 32 Crawfordsville Ind

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: ROMER G. WILSEK — Signature: [signature] — Date (Month Day Year): 05 17 88

17. [redacted]orter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Thomas Curtis — Signature: [signature] — Date (Month Day Year): 05 20 88

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Date (Month Day Year)

19. Discrepancy Indication Space: RECD PART 5 - FORWARDED TO SERV

[illegible]

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Darlene J. Conner — Signature: [signature] — Date (Month Day Year): [illegible]

IN ILLINOIS: 217 / 782-3637 — 24 HOUR EMERGENCY AND SPILL ASSISTANCE NUMBERS — OUTSIDE ILLINOIS: 800 / 424-8802

DISTRIBUTION: PART 1 GENERATOR PART 2 IEPA PART 3 FACILITY PART 4 TRANSPORTER PART 5 IEPA PART 6 GENERATOR

[illegible]

EPA ID #ILD000672121
ILL. ID #0316000058

SCA CHEMICAL SERVICES

CERTIFICATE No 014842

Certificate of Destruction

SCA Chemical Services Inc. has incinerated waste received from Duracell Interational as identified on manifest number IL2034412 at its Chicago Incineration facility and hereby certifies such destruction as of this 26 day of May 198 8.

Generator: Duracell International
Address: c/o Kraft, Inc.
4 W Kraft Court
Glenview, Il 60025
Contact: Romer Wilsek

By: D. J. Luque
Jose Luque
Title: Operations Coordinator

88-1496

APPENDIX B

AIR MONITORING DATA

B-1 FIXED-MEDIA AIR MONITORING DATA

TABLE B-1

SUMMARY OF FIXED-MEDIA AIR MONITORING DATA

Sample Number	Date	Location	Total Suspended Particulates Concentration Upwind Sample (ug/m^3)	Total Suspended Particulates Concentration Downwind Sample (ug/m^3)	Total PCB Concentration (ug/m^3)	Comments
5676-001	Feb. 09, 1988	Upwind	10			
-002	Feb. 09, 1988	Downwind		370		
-003	Feb. 09, 1988	Field Blank		50/filter		
-004	Feb. 09, 1988	Downwind			<1.0	
-005	Feb. 09, 1988	Field Blank			<1.0/filter	
-006	Feb. 10, 1988	Upwind	480			
-007	Feb. 10, 1988	Downwind		<10		
-008	Feb. 10, 1988	Field Blank		30/filter		
-009	Feb. 10, 1988	Downwind			N/R	
-010	Feb. 10, 1988	Field Blank			N/A	
-011	Feb. 11, 1988	Upwind	20			
-012	Feb. 11, 1988	Downwind		40		
-013	Feb. 11, 1988	Field Blank		10/filter		
-014	Feb. 11, 1988	Downwind			N/R	
-015	Feb. 11, 1988	Field Blank			N/A	
-016	Feb. 12, 1988	Upwind	70			
-017	Feb. 12, 1988	Downwind		480		
-018	Feb. 12, 1988	Field Blank		190/filter		
-019	Feb. 12, 1988	Downwind			N/R*	
-020	Feb. 12, 1988	Field Blank			N/A	

continued....

TABLE B-1

SUMMARY OF FIXED-MEDIA AIR MONITORING DATA

Sample Number	Date	Location	Total Suspended Particulates Concentration Upwind Sample (ug/m^3)	Total Suspended Particulates Concentration Downwind Sample (ug/m^3)	Total PCB Concentration (ug/m^3)	Comments
5676-021	Feb. 13, 1988	Upwind	90			
-022	Feb. 13, 1988	Downwind		<10		
-023	Feb. 13, 1988	Field Blank		10/filter		
-024	Feb. 13, 1988	Downwind			N/R	
-025	Feb. 13, 1988	Field Blank			N/A	
-026	Feb. 15, 1988	Upwind	800			
-027	Feb. 15, 1988	Downwind		70		
-028	Feb. 15, 1988	Field Blank		20/filter		
-029	Feb. 15, 1988	Downwind			N/R	
-030	Feb. 15, 1988	Field Blank			N/A	
-031	Feb. 23, 1988	Upwind	<20			
-032	Feb. 23, 1988	Downwind		<20		
-033	Feb. 23, 1988	Downwind			N/R	
-034	Feb. 23, 1988	Downwind		<20		
-035	Feb. 23, 1988	Downwind			N/R	
-036	Feb. 23, 1988	Field Blank			N/A	
-037	Feb. 23, 1988	Field Blank		<20 ug/filter		

continued....

TABLE B-1

SUMMARY OF FIXED-MEDIA AIR MONITORING DATA

Sample Number	Date	Location	Total Suspended Particulates Concentration Upwind Sample (ug/m^3)	Total Suspended Particulates Concentration Downwind Sample (ug/m^3)	Total PCB Concentration (ug/m^3)	Comments
5676-038	Feb. 24, 1988	Upwind	<20			
-039	Feb. 24, 1988	Downwind		29		
-040	Feb. 24, 1988	Downwind			N/R	
-041	Feb. 24, 1988	Downwind		<20		
-042	Feb. 24, 1988	Downwind			N/R	
-043	Feb. 24, 1988	Field Blank		<20 ug/filter		
-044	Feb. 24, 1988	Field Blank			N/A	
-045	Feb. 25, 1988	Upwind	<20			
-046	Feb. 25, 1988	Downwind		56		
-047	Feb. 25, 1988	Downwind			N/R	
-048	Feb. 25, 1988	Downwind		47		
-049	Feb. 25, 1988	Downwind			N/R	
-050	Feb. 25, 1988	Field Blank		<20 ug/filter		
-051	Feb. 25, 1988	Field Blank			N/A	
-052	Feb. 26, 1988	Upwind	<30			
-053	Feb. 26, 1988	Downwind		150		
-054	Feb. 26, 1988	Downwind			N/R	
-055	Feb. 26, 1988	Maximum Risk Personnel		1040		
-056	Feb. 26, 1988	Maximum Risk Personnel			<5	

continued....

TABLE B-1

SUMMARY OF FIXED-MEDIA AIR MONITORING DATA

Sample Number	Date	Location	Total Suspended Particulates Concentration Upwind Sample (ug/m^3)	Total Suspended Particulates Concentration Downwind Sample (ug/m^3)	Total PCB Concentration (ug/m^3)	Comments
5676-057	Feb. 26, 1988	Field Blank		35 ug/filter		
-058	Feb. 26, 1988	Field Blank			<0.5 ug/filter	
-059	Feb. 27, 1988	Upwind	<30			
-060	Feb. 27, 1988	Downwind		<30		
-061	Feb. 27, 1988	Downwind			N/R	
-062	Feb. 27, 1988	Maximum Risk Personnel		780		
-063	Feb. 27, 1988	Maximum Risk Personnel			<9	
-064	Feb. 27, 1988	Field Blank			<0.5 ug/filter	
-065	Feb. 27, 1988	Field Blank		<20 ug/filter		
-066	Feb. 28, 1988	Upwind	27			
-067	Feb. 28, 1988	Downwind		39		
-068	Feb. 28, 1988	Downwind			N/R	
-069	Feb. 28, 1988	Maximum Risk Personnel		213		

continued....

TABLE B-1

SUMMARY OF FIXED-MEDIA AIR MONITORING DATA

Sample Number	Date	Location	Total Suspended Particulates Concentration Upwind Sample (ug/m^3)	Total Suspended Particulates Concentration Downwind Sample (ug/m^3)	Total PCB Concentration (ug/m^3)	Comments
5676-070	Feb. 28, 1988	Maximum Risk Personnel			<0.6	
-071	Feb. 28, 1988	Field Blank			<0.5 ug/filter	
-072	Feb. 28, 1988	Field Blank		<20 ug/filter		
-073	Feb. 29, 1988	Upwind	18			
-074	Feb. 29, 1988	Downwind		32		
-075	Feb. 29, 1988	Downwind			N/R	
-076	Feb. 29, 1988	Maximum Risk Personnel		602		
-077	Feb. 29, 1988	Maximum Risk Personnel			1.3	
-078	Feb. 29, 1988	Field Blank			<0.5 ug/filter	
-079	Feb. 29, 1988	Field Blank		<20 ug/filter		
-080		Lab QA/QC				

continued....

TABLE B-1

SUMMARY OF FIXED-MEDIA AIR MONITORING DATA

Sample Number	Date	Location	Total Suspended Particulates Concentration Upwind Sample (ug/m^3)	Total Suspended Particulates Concentration Downwind Sample (ug/m^3)	Total PCB Concentration (ug/m^3)	Comments
5676-081	Mar. 1, 1988	Upwind	30			
-082	Mar. 1, 1988	Downwind		233		
-083	Mar. 1, 1988	Downwind			<0.4	
-084	Mar. 1, 1988	Downwind		40		
-085	Mar. 1, 1988	Downwind			N/R	
-086	Mar. 1, 1988	Downwind		31		
-087	Mar. 1, 1988	Downwind			N/R	
-088	Mar. 1, 1988	Maximum Risk Personnel		15,390		
-089	Mar. 1, 1988	Maximum Risk Personnel			1.8	
-090	Mar. 1, 1988	Field Blank			<0.5 ug/filter	
-091	Mar. 1, 1988	Field Blank		<20 ug/filter		

Notes:

N/R - Analysis not required; only air samples showing an excursion of 150 ug/m^3 Total Suspended Solids (TSP) between the upwind sample and downwind sample were analyzed for PCBs.

N/A - PCB field blank not analyzed because analysis of PCB sample was not required.

* - Sample not analyzed because of high TSP concentration found in the field blank, sample 5676-018.

B-2 DIRECT READOUT AIR MONITORING DATA

ORGANIC VAPORS, TOTAL DUST, OXYGEN CONTENT,

EXPLOSIVE GASES

Project No. 5671

48 Book No. _____ TITLE _____

From Page No. _____

2-12-88

TR - CALIBRATED PID MODEL PI 101 (OHM# 2PD-21) to 68.0ppm USING CALIBRATION GAS AT 64.0ppm. PROBE WAS 10.2eV AND SPAN WAS SET AT 10.0.

- THE NEEDLE SLOWLY DRIFTED UP TO THE 68.0ppm. TR DISCUSSED THIS WITH FRED CHOSKE, PROJECT CHEMIST IN FINDLAY. HE SAID IT IS NOT A PROBLEM, JUST DOCUMENT THE READINGS AND IF IT IS NEAR AN ACTION LEVEL THEN TAKE IT INTO ACCOUNT.

TR - CALIBRATED ~~TR~~ Q PORTABLE COMBUSTIBLE GAS AND O_2 ALARM MODEL 260. ADJUSTED O_2 LEVEL AND CHECKED LEL AT 54% WITH CALIBRATION GAS

- PERFORMED PID, Ox-LEL SURVEY AROUND PERIMETER OF FENCE. PID READINGS WERE BETWEEN 0.2 - 0.4ppm. BACKGROUND READINGS WERE ALSO BETWEEN 0.2-0.4ppm

- O_2 LEVELS WERE NORMAL AND LEL WAS 0.0%

2-13-88 SATURDAY

1000HRS - TR CALIBRATED THE HNU PID MODEL ~~PI~~ PI101 (OHM# 2PD-21) USING 64ppm CALIBRATION GAS AND RECEIVED A CONCENTRATION OF 67.0ppm WITH A 10.2eV PROBE, AND THE SPAN SET AT 10.0

- CALIBRATED PORTABLE COMBUSTIBLE GAS AND O_2 ALARM MODEL 260. ADJUSTED O_2 LEVEL AND CHECKED LEL AT 34% WITH CALIBRATION GAS

- PERFORMED A PID, O_2-LEL SURVEY OF THE EAST PERIMETER FENCE AND AROUND THE RAVINE AREA.

- PID READINGS WERE BETWEEN 0.2-0.4ppm AS THE SAME AS THE BACKGROUND READINGS TAKEN

- Ox-LEL READINGS WERE NORMAL FOR O_2 AND 0.0% FOR LEL

- NOTE: ONCE Ox-LEL WAS BROUGHT INTO DECON TRAILER THE O_2 CONCENTRATION READINGS STARTED FLUCTUATING, SINCE IT WAS ERRATIC. TR HAD TO ARRANGE PICK UP ANOTHER UNIT WHEN HE WAS BACK IN FINDLAY

2-16-88 TUESDAY

1430HRS - TR CALIBRATED THE HNU PID MODEL PI 101 (OHM# 2PD-21) USING 64.0ppm CALIBRATION GAS AND RECEIVED A CONCENTRATION OF 66.0ppm WITH A 10.2eV PROBE AND THE SPAN SET AT 10.0

- CALIBRATED THE MSA COMBUSTIBLE GAS AND O_2 ALARM UNIT, MODEL 260 (LCA-38). OXYGEN CALIBRATION OK AND CHECKED LEL SENSOR ~~THE~~ WITH 50% LEL CALIBRATION GAS PLUS OR RUNS 2% TO 52% LEL

- PERFORMED PID, Ox-LEL SURVEY AROUND PERIMETER OF SITE. PID READINGS INDICATED

To Page No. _____

Witnessed & Understood by me.	Date	Invented by	Date
		Recorded by Lin Rutledge	2-16-88

From Page No. —

2-16-88 CONTINUED TUESDAY

CONCENTRATIONS BETWEEN 0.2 AND 0.4 ppm WHICH IS THE SAME AS THE BACKGROUND CONCENTRATIONS - OXYGEN CONCENTRATIONS WERE NORMAL AND LEL WAS 0.0%

2-18-88 THURSDAY

WIND FROM THE EAST

1110 – TR PLACED MINIRAM (RAM-04) WEST OF PUMP HOUSE ON WEST PERIMETER FENCE ZERO ON UNIT AT 0.79 $\mu g/m^3$

1310 – TR STOPPED MINI RAM. TWA WAS 50 $\mu g/m^3$ FOR THE TWO HOURS THE UNIT WAS THEN STARTED AGAIN

1510 – TR STOPPED THE MINI RAM. THE TWA WAS 70 $\mu g/m^3$ FOR THE TWO HOURS

2-19-88 FRIDAY

0930 – TR CALIBRATED THE MSA PORTABLE ~~GAS~~ COMBUSTIBLE GAS ~~ANALYSER~~ AND O_2 ALARM, MODEL 360 (LOX-38) TO 52% LEL WITH CALIBRATION ~~&~~ GAS SET AT 50% I2% . O_2 SENSOR CALIBRAT .

- CHECKED PUMPHOUSE AND AROUND WELL CASING. O_2 LEVELS WERE NORMAL AND LEL WAS 0.0% WELL CASING WAS CHECKED PERIODICALLY DURING WELL PIPE REMOVAL. ALL RESULTS WERE THE SAME. A PARTNER SAW WAS USED TO CUT THE PIPE INTO SECTIONS

2-23-88 TUESDAY WIND FROM THE NORTH WEST

1150 – TR PLACED MINI RAM ON EAST PERIMETER FENCE ACROSS FROM TRANSITION AREA ZERO AT .80 mg/m^3

1345 – CALIBRATED THE PORTABLE COMBUSTIBLE GAS AND O_2 ALARM MODEL 260 (LOX-38) TO 52% LEL USING CALIBRATION GAS ~~AT~~ WITH A CONCENTRATION OF 50% I2% LEL.

1350 – STOPPED MINI RAM TWA OF 90 $\mu g/m^3$ FOR TWO HOURS

1400 CALIBRATED HNU PID MODEL PI101 (2PD-21) TO 66.0 ppm WITH CALIBRATION GAS AT 64.0 ppm USING A 10.2eV PROBE WITH SPAN AT 10.0

To Page No. —

Witnessed & Understood by me.	Date	Invented by	Date
		Recorded by Jim Ritters	2-23-88

Project No. 5676

50 Book No. _____ TITLE _____

From Page No. _____

2-23-88 CONTINUED TUESDAY

- PERFORMED PID AND O_2-LEL SURVEY AROUND OUTSIDE OF PERIMETER FENCE, UPWIND BACKGROUND OF 0.0 ppm FID WAS NOT EXCEEDED. O_2 LEVELS WERE NORMAL AND LEL WAS 0.0%

- TOOK PID AND O_2-LEL READING ~~AT~~ AT A TEST PIT NEAR THE OLD INCINERATOR. ~~JR~~ 2R DETECTED NOTHING ABOVE BACKGROUND FROM THE PID, O_2 LEVELS WERE NORMAL, AND LEL ~~WAS~~ 2R WAS 0.0%

2-24-88 WEDNESDAY

- CALIBRATED THE MSA PORTABLE COMBUSTIBLE GAS AND O_2 ALARM MODEL 260 (LOX-42). TO 48% LEL WITH CALIBRATION GAS THAT HAS A CONCENTRATION OF 50% ± 2% LEL. O_2 SENSOR OK

- CALIBRATED HNU PID MODEL PI 101 (210-21) TO 65.0 ppm WITH CALIBRATION GAS THAT HAS A CONCENTRATION OF 64 ppm USING A 10.2 eV PROBE AND SPAN SET AT 10.0

- PERFORMED AIR SURVEY INSIDE RAVINE AREA WITH THE PID AND OX-LEL BEFORE DEBRIS REMOVAL BEGAN. PID READINGS WERE AT BACKGROUND CONCENTRATIONS OF 0.2 ppm. O_2 CONCENTRATIONS WERE NORMAL AND LEL WAS 0.0%

APPROXIMATELY 1500 HRS TR CONDUCTED ANOTHER AIR SURVEY OF THE RAVINE AREA DURING DEBRIS REMOVAL. RESULTS WERE AS BEFORE

1450 MINI RAM (RAM-04) WAS PLACED ON EAST PERIMETER FENCE ACROSS FROM INTERIM CELL
1650 MINI RAM WAS STOPPED TWA = 80 $\mu g/m^3$ AFTER TWO HOURS

2-25-88 THURSDAY

- CALIBRATED HNU PID MODEL PI 101 (210-21) TO 64 ppm WITH CALIBRATION GAS AT A CONCENTRATION OF 4.0 ppm USING A 10.2 eV PROBE AND SPAN SET AT 9.9

- CALIBRATED MSA PORTABLE COMBUSTIBLE GAS AND O_2 ALARM UNIT MODEL 260 (LOX-42). LEL SENSOR REGISTERED 48% LEL USING CALIBRATION GAS WITH CONCENTRATION OF 50% ± 2% LEL

1200 HRS PLACED MINI RAM (RAM-04) ON EAST SIDE OF RAVINE APPROXIMATELY 50 ft NORTH OF SOUTHEAST CORNER ALONG THE FENCE.

1400 1500 HRS PERFORMED PID AND OX-LEL SURVEY OF RAVINE AREA DURING DEBRIS REMOVAL

To Page No. _____

Witnessed & understood by me.	Date	Invented by	Date 2-25-88

From Page No. _

2-25-88 CONTINUED THURSDAY

- PID RESULTS ARE THE SAME AS BACKGROUND OF 0.3 ppm. O_2 LEVELS WERE NORMAL AND LEL WAS 0.0%

1630 HRS STOPPED MINI RAM TWA = 90 µg/m³ FOR 4½ HRS. ZERO VALUE IS 0.87 mg/m³

2-26-88 FRIDAY

- 1000 HRS LOCATED MINI RAM (RAM-04) IN THE MIDDLE OF THE WEST SNOWFENCE FOR THE RAVINE ZERO AT 0.80 mg/m³

- 1200 HRS STOPPED MINI RAM TWA = 270 µg/m³ AFTER TWO HOURS
RELOCATED MINIRAM ON EAST RAVINE FENCE 40-60 ft NORTH OF SOUTHEAST CORNER
- 1500 HRS STOPPED MINIRAM TWA = 20 µg/m³ FOR 3 HOURS
RELOCATED MINIRAM TO 50 ft SOUTH OF CHAIN LINK FENCE ON SNOWFENCE
- 1700 HRS STOPPED MINIRAM TWA = 10 µg/m³ FOR TWO HOURS

2-27-88 SATURDAY

- CALIBRATED HNU PID MODEL PI 101 (2PD-21) TO 64 ppm WITH CALIBRATION GAS AT A CONCENTRATION OF 64.0 ppm USING A 10.2eV PROBE AND SPAN SET AT 9.9

- CALIBRATED MSA PORTABLE COMBUSTIBLE GAS AND O_2 ALARM UNIT MODEL 260 (LOX-42). LEL SENSOR REGISTERED 48% LEL USING CALIBRATION GAS WITH CONCENTRATION OF 50% ± 2% LEL

1000 - 1645 CONDUCTED AIR SURVEY WITH PID AND Ex-LEL IN RAVINE AREA DURING EXCAVATION. PID READINGS WERE AT BACKGROUND CONCENTRATIONS OF 0.2 ppm - 0.4 ppm. O_2 CONCENTRATION WAS NORMAL AND LEL WAS AT 0.0%

2-28-88 SUNDAY

- 0920 ~~Set~~ PLACED MINI RAM (RAM-04) ON PERIMETER FENCE NEAR RAVINE ACCESS ROAD 20ft WEST OF FENCE POLE ON TOP OF RAVINES WEST BANK ZERO 0.80 mg/m³

- CALIBRATED HNU PID MODEL PI 101 (2PD-21) TO 64 ppm WITH CALIBRATION GAS AT A CONCENTRATION OF 64.0 ppm USING A 10.2 eV PROBE AND SPAN SET AT 9.76

To Page No. _

Witnessed & Understood by me.	Date	Invented by	Date
		Recorded by Ron Rutgers	2-28-88

From Page No. ...

2-29-88 CONTINUED SUNDAY

- CHECKED MSA PORTABLE COMBUSTIBLE GAS AND O_2 ALARM UNIT MODEL 260 (LOX-42); O_2 SENSOR IS FINE AND LEL SENSOR GAVE A 48% LEL WITH 50% ± 2% CALIBRATION GAS

- PERFORMED PID AND OX-LEL SURVEY ON EAST SIDE OF ZONE B EXCAVATION. PID READINGS WERE AT CONCENTRATIONS OF 0.2 ppm WHICH IS BACKGROUND. ~~0~~ 20 OXYGEN CONCENTRATIONS WERE NORMAL AND LEL WAS 0.0%

1530 HRS STOPPED MINIRAM TWA WAS 0.0 $\mu g/m^3$ FOR 6 HOURS
1532 HRS RESTARTED IT
NOTE T. INCOP WAS CUTTING TREE WITH A CHAIN SAW UPWIND OF UNIT
1730 STOPPED UNIT TWA = 50 $\mu g/m^3$ FOR 2 HOURS
RESTARTED UNIT
1930 STOPPED UNIT TWA = 10 $\mu g/m^3$ FOR 2 HOURS

2-29-88 MONDAY

0930 PLACED MINIRAM (RAM-04) ON 20 SNOW FENCE AT MIDDLE OF ZONE B3
1645 CHECKED MINIRAM TWA = 20 $\mu g/m^3$ AFTER 7 ½ HOURS
1749 MINI RAM COMPLETED CYCLE OF 8.44 HOURS AND SHUT ITSELF OFF TWA = 20 $\mu g/m^3$

3-1-88 TUESDAY

1020 PLACED MINIRAM (RAM-04) ON EAST PERIMETER FENCE 10FT SOUTH OF ZONE B1
1200 STOPPED UNIT TWA WAS 130 $\mu g/m^3$
NOTE: KILN DUST WAS ~~FROM~~ BLOWING INTO THIS AREA
RELOCATED MINIRAM TO NORTHEAST CORNER OF ZONE B2
1445 STOPPED MINI RAM TWA AT 20 $\mu g/m^3$ 2HR 45MIN

JAY SAID LOADERS ARE CREATED DUST AS THEY DRIVE ON THE ROAD AND IT IS ~~REALIZE~~ TO THE STAFF LINER PEOPLE IN LEVEL "D". USED MINIRAM AT THE ROAD AS A LOADER WENT BY. THE READING 110 $\mu g/m^3$. JAY TOLD TA JR TO INSISTUTE DUST CONTROL PROCEDURES

1450 PLACED MINIRAM 10FT SOUTH OF ZONE B1 ON PERIMETER FENCE
1650 ~~ST~~ CHECKED UNIT TWA = 90 $\mu g/m^3$ FOR 2 HOURS
1925 STOPPED UNIT TWA = 220 $\mu g/m^3$ FOR 4 HOURS 35 MIN.

To Page No. _____

Witnessed & Understood by me.	Date	Invented by	Date 3-1-88
		Recorded by Lin Rutter	

From Page No. ___

3-5-88 SATURDAY

- CALIBRATED HNU PID MODEL PI101 (2PB-21) TO 64.0 ppm WITH CALIBRATION GAS THAT HAS A CONCENTRATION OF 64 ppm USING A 10.2eV PROBE AND SPAN AT 9.76

- CALIBRATED MSA PORTABLE COMBUSTIBLE GAS AND O_2 ALARM UNIT MODEL 260 (LOX-42). O_2 SENSOR IS OK AND LEL SENSOR GAVE A 44% LEL WITH 50% ±2% CALIBRATION GAS

T. HOOP WAS PLUGGING UP UNDERGROUND PIPES WITH CONCRETE. ONE HOLE BEHIND SUPERVISOR MIXING AND STORAGE WAS OVER HIS SHOULDERS. A CONFINED SPACE ENTRY PERMIT WAS COMPLETED PID READINGS WERE AT BACKGROUND OF 0.2 ppm O_2 LEVELS WERE NORMAL AND LEL WAS 0.0%

- TOOK PID OR LEL READINGS OF OTHER PIPE EXCAVATION AREAS TO BE PLUGGED AND CAME UP WITH SIMILAR RESULTS

Jim Rathyen

To Page No. ___

Witnessed & Understood by me.	Date	Invented by	Date
		Recorded by Jim Rathyen	3-5-88

APPENDIX C

ANALYTICAL RESULTS FOR BACKFILL MATERIAL

WADSWORTH/ALERT
LABORATORIES, INC.

PCB ANALYTICAL REPORT

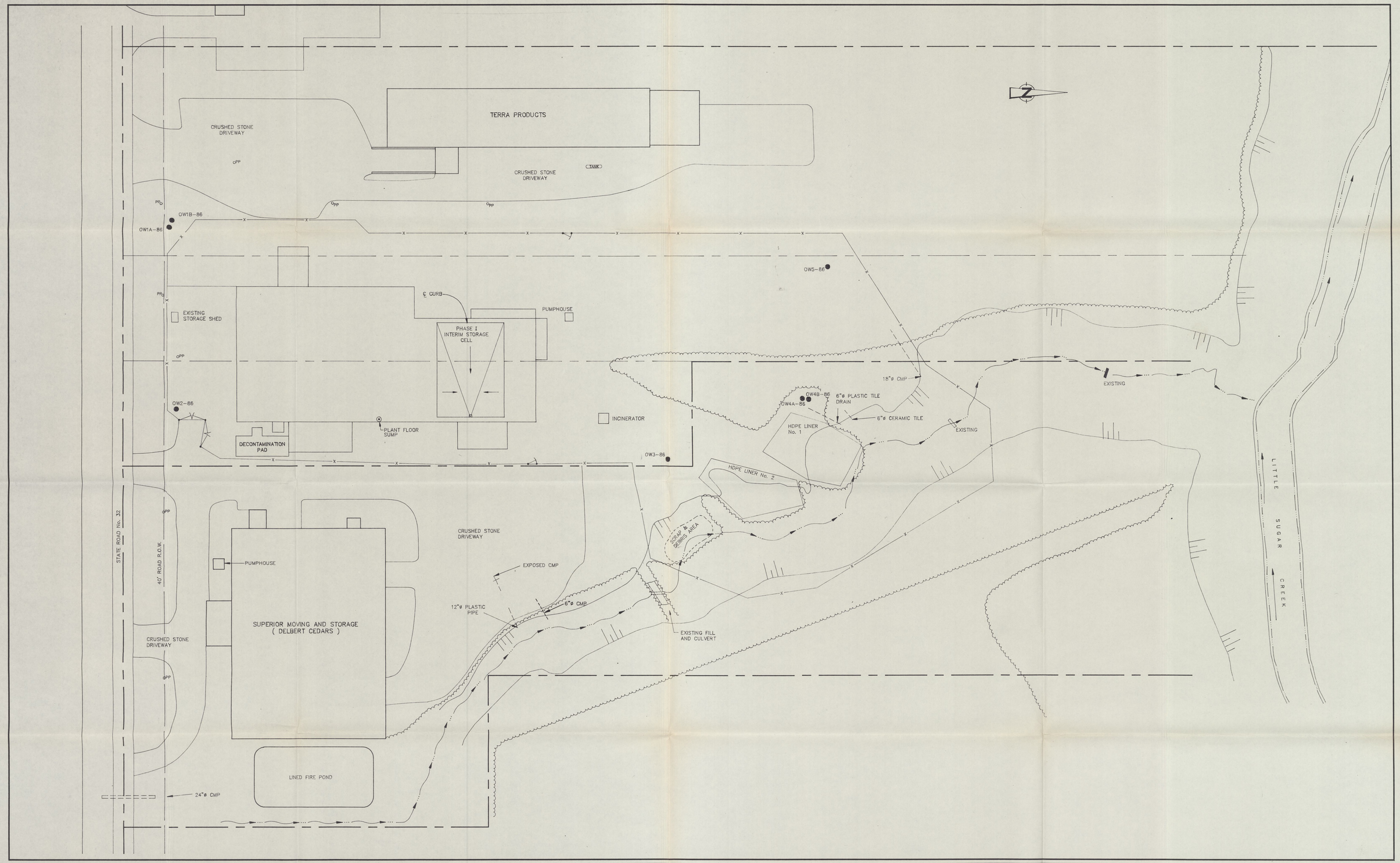
COMPANY : CONESTOGA-ROVERS & ASSOCIATES, LTD.
LABORATORY ID : 4927-54148
SAMPLE MATRIX : SOIL

RECEIVING DATE : 3/ 3/88
EXTRACTION DATE : 3/ 3/88
ANALYSIS DATE : 3/17/88

SAMPLE ID : CRA-8-2024 3/2/88 1215

	RESULT (mg/kg)	DETECTION LIMIT
PCB-1016	ND	0.1
PCB-1221	ND	0.1
PCB-1232	ND	0.1
PCB-1242	ND	0.1
PCB-1248	ND	0.1
PCB-1254	ND	0.2
PCB-1260	ND	0.2

ND - NONE DETECTED



LEGEND

- TREE LINE
- TOP OF SLOPE
- STREAM FLOW
- CREEK BANK
- OWi-86 OBSERVATION WELL
- oPP POWER POLE
- PROPERTY LINE
- -x-x- SECURITY FENCE
- ACCESS GATE
- OIL ABSORBENT BOOM
- SEDIMENT TRAP

No	Revision	Date	Initial

Approved

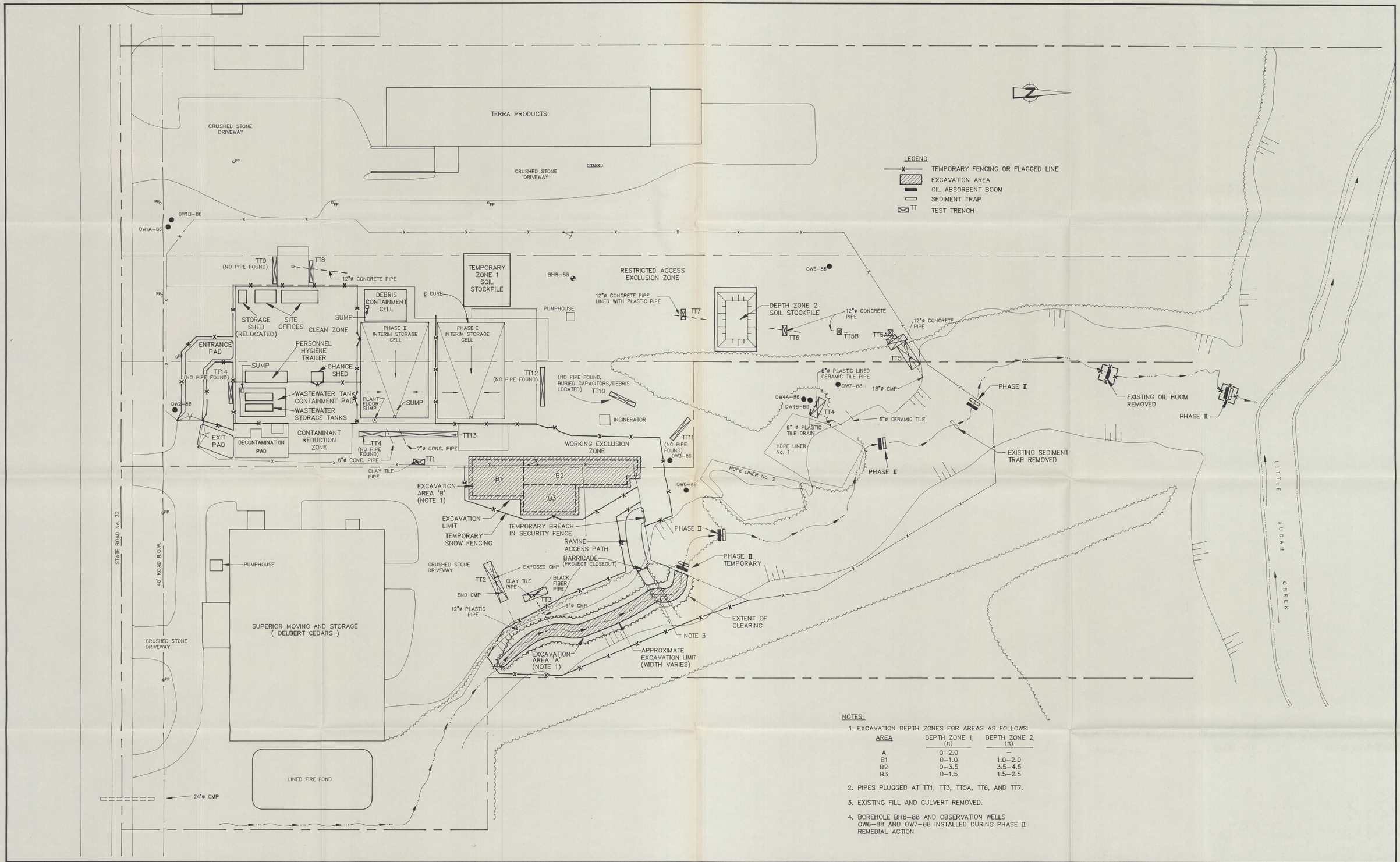
FORMER P.R. MALLORY PLANT SITE
CRAWFORDSVILLE, INDIANA.

PHASE II REMEDIAL ACTION REPORT

EXISTING CONDITIONS
JANUARY 31, 1988

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: WRW	Scale: 1" = 40'	Date: APRIL 4, 1988	File No: S	Rev.No: A
Designed by: J.C.				
Checked by: R.T.P.	Field book:	Project No: 1916	Drawing No: 48 (P-19) PLAN 1	



NOTES:

1. EXCAVATION DEPTH ZONES FOR AREAS AS FOLLOWS:

AREA	DEPTH ZONE 1 (ft)	DEPTH ZONE 2 (ft)
A	0–2.0	–
B1	0–1.0	1.0–2.0
B2	0–3.5	3.5–4.5
B3	0–1.5	1.5–2.5

2. PIPES PLUGGED AT TT1, TT3, TT5A, TT6, AND TT7.
3. EXISTING FILL AND CULVERT REMOVED.
4. BOREHOLE BH8–88 AND OBSERVATION WELLS OW6–88 AND OW7–88 INSTALLED DURING PHASE II REMEDIAL ACTION

LEGEND

TREE LINE
TOP OF SLOPE
STREAM FLOW
CREEK BANK
OW5-86 OBSERVATION WELL
BH8-88 BOREHOLE
PROPERTY LINE
SECURITY FENCE
ACCESS GATE
OPP POWER POLE

№	Revision	Date	Initial

Approved

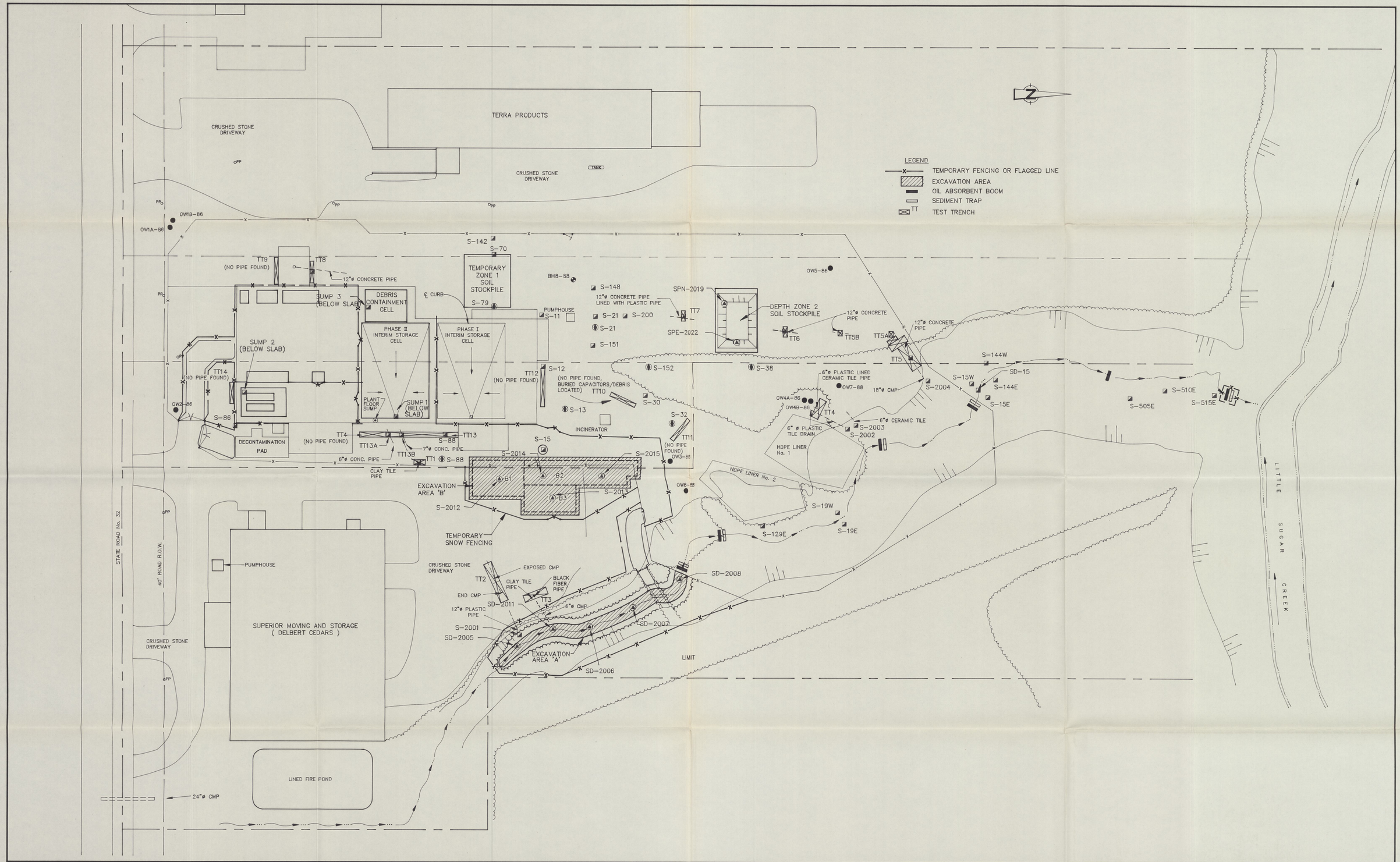
FORMER P.R. MALLORY PLANT SITE
CRAWFORDSVILLE, INDIANA.

PHASE II REMEDIAL ACTION REPORT

PHASE II REMEDIAL CONSTRUCTION PLAN
GENERAL ARRANGEMENT

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: B.T.S.	Scale: 1" = 40'	Date: AUGUST 30,1988	File №: S	Rev.№:
Designed by: J.C.				
Checked by: R.T.P.	Field book:	Project №: 1916	Drawing №: 49 (P-20) PLAN 2	



LEGEND

- TREE LINE
- TOP OF SLOPE
- STREAM FLOW
- CREEK BANK
- OW5-86 OBSERVATION WELL
- BH8-88 BOREHOLE
- PROPERTY LINE
- SECURITY FENCE
- ACCESS GATE
- oPP POWER POLE
- S-21 INVESTIGATIVE SOIL/SEDIMENT SAMPLE LOCATION FOR PCBs
- S-2012 CONFIRMATORY SOIL/SEDIMENT SAMPLE LOCATION FOR PCBs
- INVESTIGATIVE SOIL SAMPLE LOCATION FOR CDD/CDF
- INVESTIGATIVE SOIL SAMPLE LOCATION FOR PCBs AND CDD/CDF

№	Revision	Date	Initial

Approved

FORMER P.R. MALLORY PLANT SITE
CRAWFORDSVILLE, INDIANA.

PHASE II REMEDIAL ACTION REPORT

PHASE II SAMPLE LOCATIONS

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: B.L.P.	Scale: 1" = 40'	Date: AUGUST 1988	File №: S	Rev.№: 0
Designed by: J.C.				
Checked by: R.T.P.	Field book:	Project №: 1916	Drawing №: 50 (P-21) PLAN 3	